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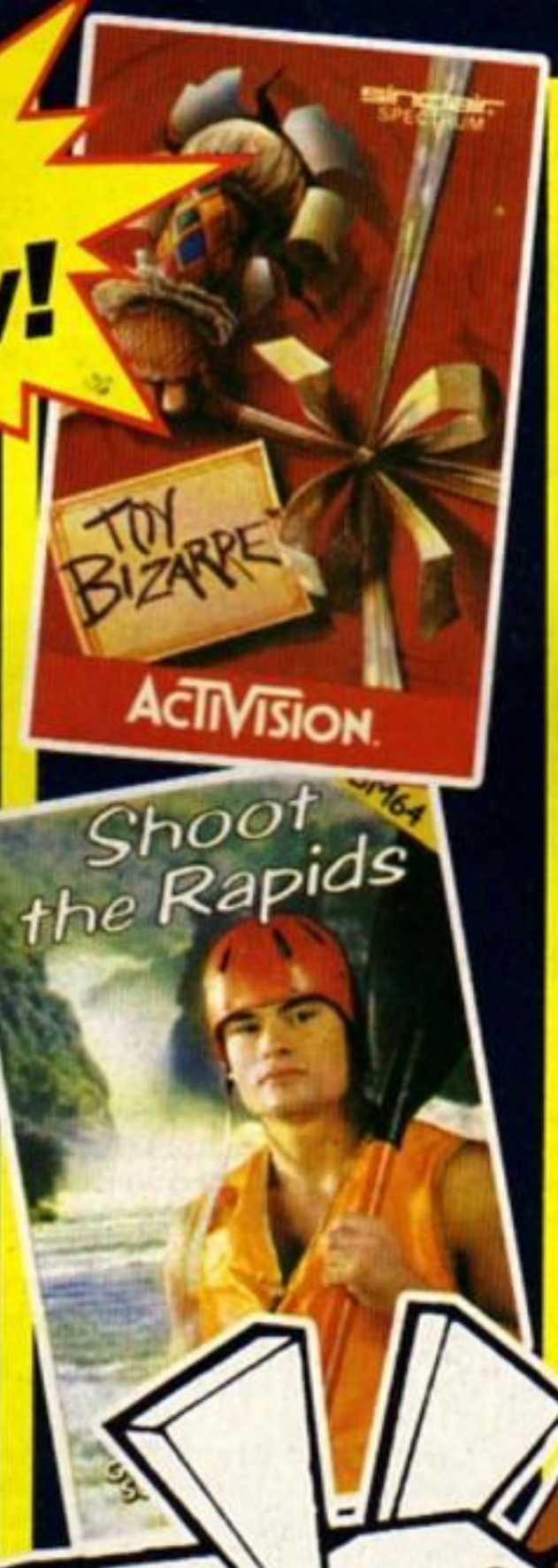
HOME Computing WEEKLY

First review!

Activision's Toy Bizarre for Spectrum



Cowboys and Canoes

Dynamic duo must be won!

New Generation Software

Mighty mouse It's AMXellent!

Iron Curtain talks

Can your micro speak Russian? Well, the Russian speaking micro has been seen in Moscow this week — and what's more it's British.

Acorn, Sinclair and Memotech took their machines to a Russian educational equipment fair: Technical Facilities in Training 1985, held from January 15-23. Both Acorn and Memotech had Russian keyboards and BASICs on show too.

The Acorn machine was bilingual, switchable from English to Cyrillic character sets, whilst Memotech's machine was dedicated and even had Russian language software on demonstration.

Sinclair was showing it's

Continued on page 5

Feed the World

Soft-Aid is the computer industry's response to the Ethiopian Famine Appeal and Bob Geldorf's Band Aid success with Feed the World.

Fourteen British software houses have been rallied by Rod Cousens, managing director of Quicksilva, to raise money by the sale of a special games compilation cassette.

There will be two tapes — one for the Spectrum and another for the Commodore 64, each containing 10 of the recent best-selling games. The only titles to be confirmed by press day were Pyramid by Fantasy and Quicksilva's Fred.

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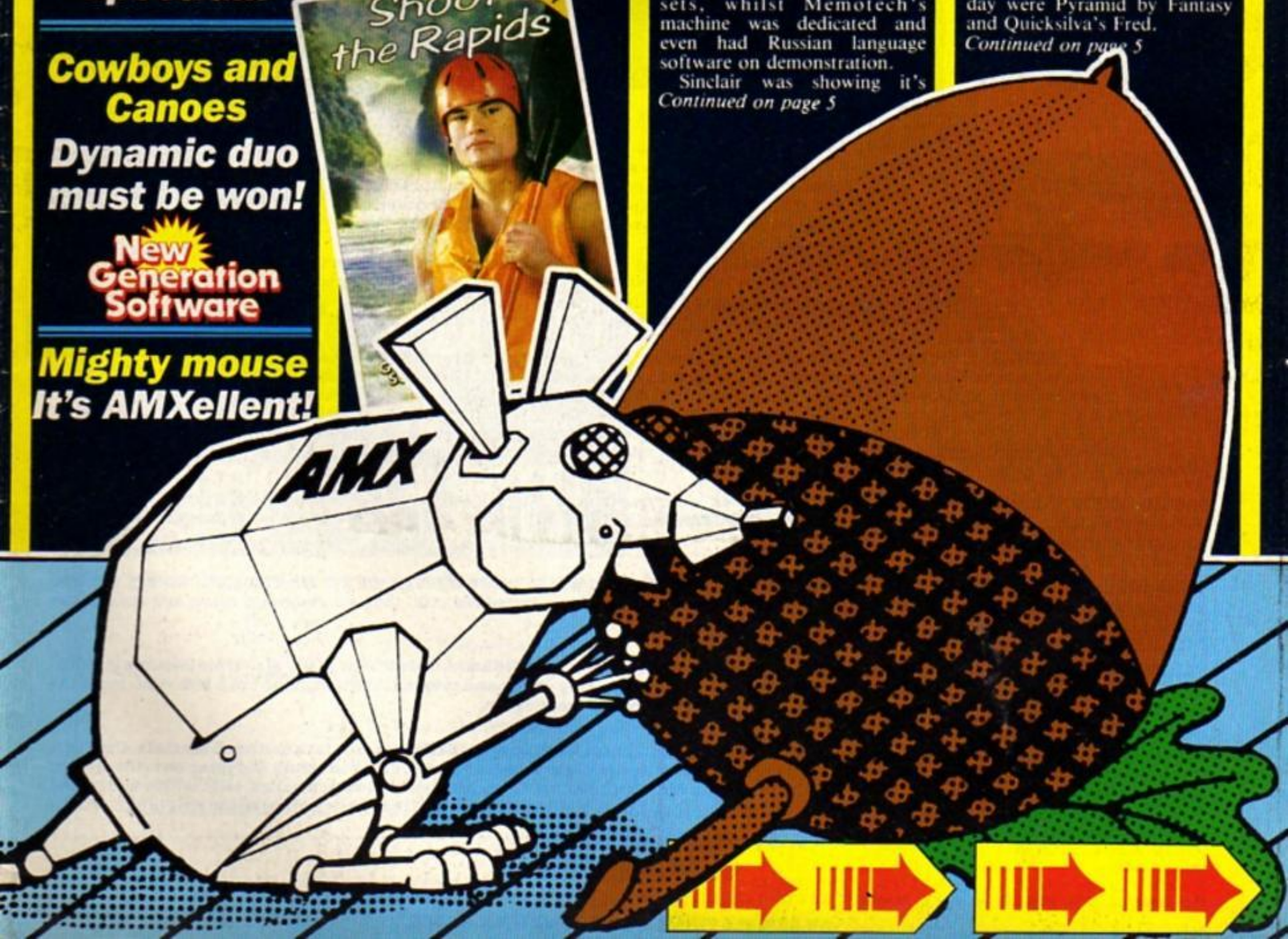
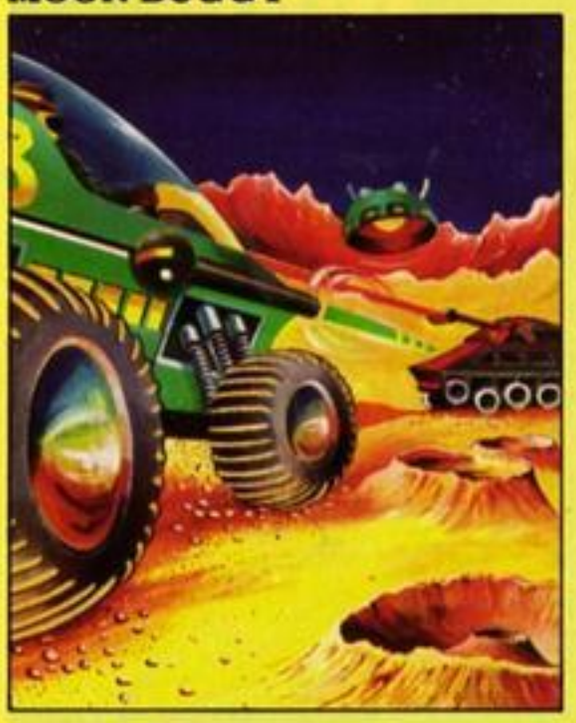


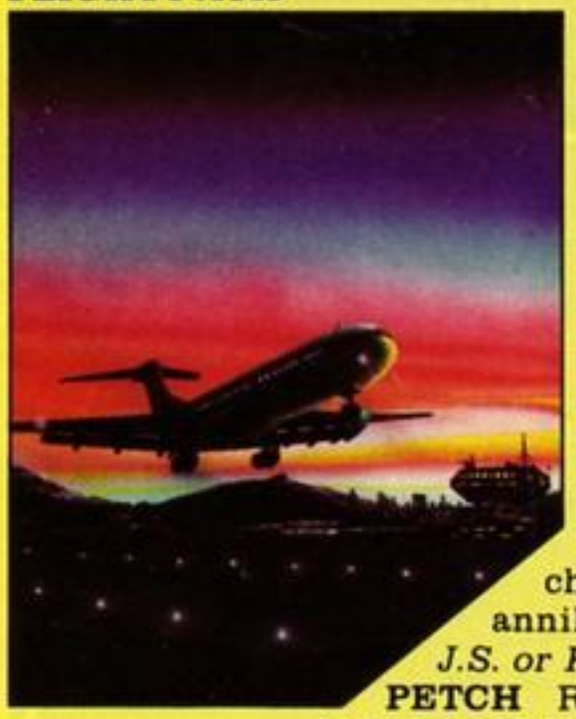
COMMODORE C16 AND PLUS 4

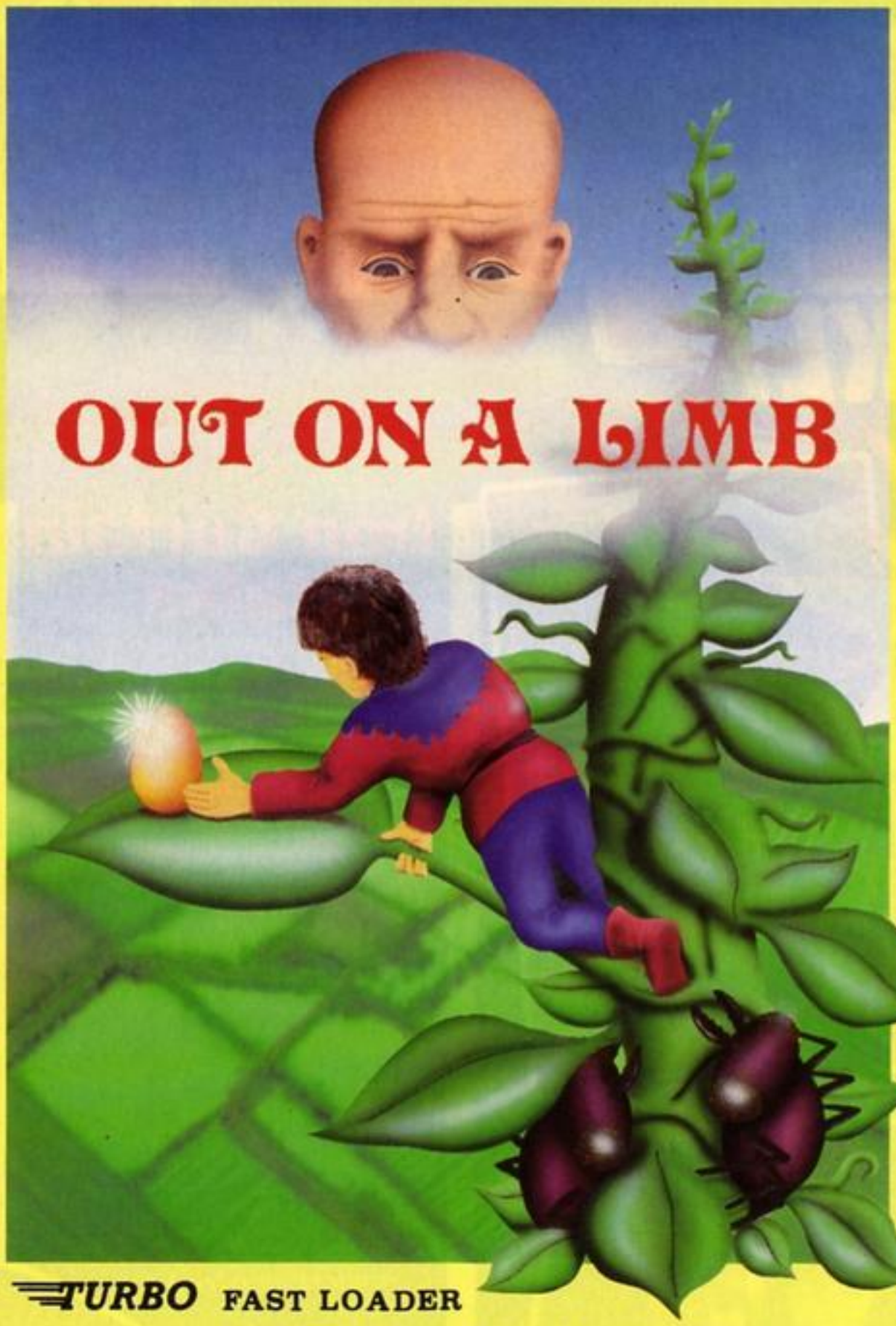
LAS VEGAS

MOON BUGGY



FLIGHT PATH

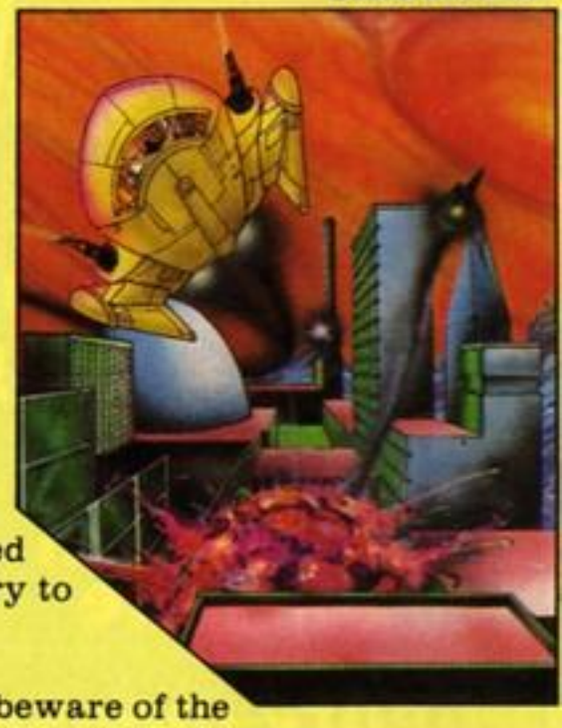




ZODIAC

3D TIME TREK

SKRAMBLE



TURBO FAST LOADER

LAS VEGAS Las Vegas brings all the challenges of a deluxe arcade fruit machine direct to your fingertips. Many exciting features include, gamble, cancel, collect, nudge and number options, with a three row display and maximum payout of 20$.
K.B. Only C.16 £6.95

ZODIAC This is an enthralling arcade adventure in which the evil powers of hell have scattered the signs of the Zodiac in the four hundred chambers of the abyss. Struggle to collect these signs and at the same time try to annihilate everything in your way. How long can you stay alive?
J.S. or K.B. C.16 £6.95

PETCH Race Petch around the screen, moving ice blocks to alter the maze, however, beware of the nasty monsters who are constantly chasing Petch as you attempt to collect the bonus cherries. Also if you can touch the edge of the maze the monsters will suddenly burst into flames, but look out they'll soon be back!
J.S. or K.B. C.16 £6.95

MOON BUGGY You must skillfully manoeuvre your jumping patrol vehicle over dangerous moon craters as well as large boulders and cunningly placed mines. Not only this but avoid the hovering alien spaceship as it bombards you from above.
J.S. or K.B. C.16 £6.95

3D TIME TREK As sole survivor of the planet "Corillian" your quest is one of anger and revenge. The starship you are flying is full of the latest inboard computers and extra powerful sensors. Also included are full 3D graphics, to add unbelievable realism to this fantastic journey through time itself, and beyond.
J.S. and K.B. C.16 £6.95

SKRAMBLE Earth has been overrun by the Cobrons and its up to you to battle through the six ferocious and testing sectors. Adversaries include meteors, UFO's and deadly fireballs. Fly through an armoured city, then an elaborate maze and finally the command base itself.
J.S. or K.B. C.16 £6.95

FLIGHT PATH Flight Path is without doubt the best flight simulator on the C/16 and Amstrad. The many elaborate features include; Altometer, flaps, directional headings, crosswinds, fires, ground warning lights and reverse thrust to name but a few. Also included are smooth graphics as you take off, cruise over mountains, and land once again.
J.S. and K.B. C.16 £6.95

OUT ON A LIMB This is a fantastic and in parts outrageously funny game. Based on the fairytale of Jack and the Beanstalk, Out On A Limb is full of the most strange and eccentric characters you are ever likely to meet. Firstly, climb the stalk and jump onto the clouds, then enter the giant's castle searching for treasures. However, watch out for vacuum cleaners, musical notes, televisions and potted plants, all of which chase you round the many and elaborate rooms of the castle. Once the treasure is collected the single exit will be opened, and then.....?
J.S. or K.B. C.16 £6.95

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Home Computing WEEKLY

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BRITAIN'S BRIGHTEST

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TOP 20 Software

Compiled by Gallup

HCW is proud to present the Gallup software chart — the one to believe in. Gallup's reputation as a credible market research company is second to none. This software study is carried out nationwide in both independent and chain stores, on a weekly basis. This is the chart to watch out for — the one you know you can trust.

Week Ending January 23, 1985

LAST WEEK	MOVE	THIS WEEK	TITLE	PUBLISHER	SPECTRUM	CBM 64	BBC	ELECTRON	VIC 20	AMSTRAD	ATARI	OTHERS
1	●	1	Ghostbusters	Activision	●	●						
3	▲	2	Daley Thompson's Decathlon	Ocean	●	●						
10	▲	3	Elite	Acornsoft			●	●				
9	▼	4	Match Day	Ocean	●							
4	▼	5	Booty	Firebird	●	●						
20	▲	6	Hunchback	Ocean	●	●	●	●	●			
6	▼	7	Manic Miner	Software Projects	●	●	●			●		●
9	▲	8	Hunchback II	Ocean	●	●						
5	▼	9	Football Manager	Addictive	●	●	●			●		●
24	▲	10	Select 1	Computer Records	●	●						
8	▼	11	Blockbusters	Macsen	●	●	●	●				
7	▼	12	Air Wolf	Elite	●							
15	▲	13	Starstrike 3D	Realtime	●							
11	▼	14	Pyjamarama	Mikro-Gen	●	●					●	
16	▲	15	Combat Lynx	Durell	●	●					●	
18	▲	16	American Football	Mind Games	●	●					●	
22	▲	17	Jet Set Willy	Software Projects	●	●						●
□	R/E	18	Impossible Mission	CBS		●						
14	▼	19	Beach-Head	US Gold	●	●						
□	N/E	20	Blue Max	US Gold	●	●						●

SPECTRUM Top Ten

1. **Ghostbusters** — Activision
2. **Match Day** — Ocean
3. **Daley Thompson's Decathlon** — Ocean
4. **Airwolf** — Elite
5. **Starstrike 3D** — Realtime
6. **Booty** — Firebird
7. **Hunchback II** — Ocean
8. **Knight Lore** — Ultimate
9. **Underwurlde** — Ultimate

BBC Top Ten

1. **Elite** — Acornsoft
2. **Sabre Wolf** — Ultimate
3. **Blockbusters** — Macsen
4. **Football Manager** — Addictive
5. **Manic Miner** — Software Projects
6. **Scrabble** — Leisure Genius
7. **Snooker** — Visions
8. **Grand Prix 3D** — Software Invasion
9. **Frak!** — Aardvark
10. **Hunchback** — Ocean

COMMODORE Top Ten

1. **Ghostbusters** — Activision
2. **Impossible Mission** — CBS
3. **Daley Thompson's Decathlon** — Ocean
4. **Raid Over Moscow** — US Gold
5. **Hunchback II** — Oean
6. **Booty** — Firebird
7. **Staff of Karnath** — Ultimate
8. **Spy Hunter** — US Gold
9. **Bruce Lee** — US Gold
10. **International Football** — Commodore

Compiled by Gallup for the industry's weekly trade magazine, Computer and Software Retailing.
For details contact John Sorrenti, Computer and Software Retailing, No. 1 Golden Square, London W1R 3AB. 01-437-0626

Iron Curtain talks

From front page

entire range of machines from the ZX81 to the QL. It claims to already have a user base of some 200,000 machines in Eastern Europe. These are machines which have been bought by visitors to the West and taken home with them.

There are even a number of Eastern European user groups who publish their own newsletters and hold regular meetings.

Selling to Russia isn't an easy process. All orders must be placed with the Ministry of Education who passes them to the Foreign Ministry before they are sent to one of the Russian buying companies.

As the Acorn spokesman said: 'Selling to Russia is rather like sailing to China. It seems like a good idea at first, but actually takes three years.'

The reason there is so much activity in Eastern Europe at the moment can be traced back to the change in the Cocom agreement. Six months ago this agreement between NATO signatories was changed to allow the export of certain microprocessor-based products beyond the Iron Curtain.

Previously it was against this agreement to export computers based on both the Z80 and 6502 processor chips to any communist country in Eastern Europe.

On the eighth day of the nine-day exhibition Microdealer's team met a buyer who had travelled from a far flung province to place an order. It appears that he had read about the Memotech machine in two separate publications and had dropped everything in order to see the machine before the end of the fair.

A Microdealer spokesman commented: 'We couldn't even take the order. We are looking to set up a real trading relationship with the USSR, and this takes time.' Microdealer will take orders in the future, but only when the trading links have been established formally.

Acorn has left two of it's salesmen in Moscow. One had decided to stay for another month, whilst the other will return after one week. Acorn's spokesman said: 'The Russians are committed to buying Western expertise for their schools and colleges and the BBC is of great interest to them.'

The next major exhibition in Eastern Europe will be in Leipzig from March 10 to 16, and a number of companies will be showing their goods on the British stand.

Feed the World

From front page

Argus Specialist Publications, the publishers of Home Computing Weekly, have offered free advertising space for the tapes in a range of their leading magazines. This should mean that a minimum of £1.50 from each tape will be sent straight to the appeal.

There is a chance that this figure could be higher still if the retailers agree to take a minimum profit margin. As the product is fully endorsed by Bob Geldorf, it is hoped that all sectors of the software industry will play their part.

The tapes will be far longer than normal computer games tapes, yet will cost only £2.99, making them exceptional value in every way. If you missed just one of the games when they were first released, you couldn't find them any cheaper than this.

Pat on the back

There were 10 differences to spot in our Statesoft Competition. Here are the names of the 111 winners: K M Heyslop, Rossendale; S Jones, Chester; L Turner, Hull; D Watson, Ripley; P Harrison, Borenhamwood; U Stefahn, Belgium; J Kingsbury, St Athan; D Hinton, West Bromwich; J Woffenden, St Albans; R Battams, London; P Ramsay, Scotland; D Taylor, Accrington; A Copestick, Stoke on Trent; S Pyle, Coventry; J Page, Swindon; P Elliott, Andover; K Winfield, Stock on Trent; P Wareham, Gerrards Cross; J H Berry, Wigan; D Macdonald, London; C Deboer, Hull; M T Irwin, Huntingdon; J R Strang, Manchester; P Fairbairn, Stockport; J Lam, London; B Hooper, Isle of Man; J Alba, London; J V Froggart, Wimborne; J B Robinson, Stevenage; N Wales, New Romney; D Pickford, Tameside; A Seddon, Leigh; J K Abbasi, Bradford; N Peet, Leyland; S Ewer, Suffolk; N Boothman, Cheetham; E Armstrong, Bedford; I Chuda, Sudbury; S Bowes, Goole; S Dix, Kingsthorpe; D Woods, Merseyside; C McNaught, Lancashire; M Parker, Bexleyheath; J Garard, Bournemouth; D A Porter, Rochford; C Maciver, Perthshire; D Reynard, Bradford; K G Moutrey, Cleveland; S Chambers, Hornchurch; G Ablett, Spalding; P Goodrum, Norfolk; R G Tester, Hassocks; G Pearce, Rainham; D West, Stockton on Tees; S Ackerman, Mitcham; P A Washbrooke, Birmingham; D Vickers, Nottingham; C Scarnell, Birmingham; S Woodward, Mansfield; D Greenough, Manchester; C Moran, Bristol; G W Smith, St Ives, T Dutton, Westerham; R Moe, Norfolk; T Salfi, Leeds; C Crane, Stoke on Trent; T Merrigan, London; E Haggerty, Blyth; D King, Bootle; P Walmsley, Blackburn; D Richards, London; A Dalli, London; C Blair, Farnham; J L Kelly, Wigan; A C Hoare, South Wirral; S Meadows, Billinge; J Hemmings, Brockhall; K Foreman, Pontefract; J Stewart, Aberdeen; J Kerrigan, London; D Culpin, Corby; S Allen, Cardiff; E Dicken, Retford; M Shafaq, Nelson; P Gasan, Stroud; J Heath, Plymouth; N Morrison, Stamford; Z Hyder, Croydon; P Smith, Rotherham; V Cassey, Glasgow; R Demetriades, Glasgow; M A Dale, Stoke on Trent; P Beckinham, Belvedere; A Rahman, Nottingham; A Henderson, Glasgow; S Lacey, Tunbridge Wells; D R Dickerson, Huntingdon; A Brain, London; P Shepherd, Nottingham; M Frith, Romford; I L Fogg, Chessington; J Vardy, Stevenage; J Dawson, Sheffield; P Teare, Newcastle upon Tyne; N Sweetman, Beaconsfield; M Eaglen, A Mc Crudden, Dundee; C Kaye, Chesterfield; R Taylor, Bolton; G Wilson, Tyne and Wear; R Boxall, Rustington.

Scores of winners

There were 10 differences to spot in our Warlock competition. Here are the names of the 40 winners: G K Churcher, Southampton; F R Puttock, Heathfield; C Ottaway, Sheppey; C Dews, Burntwood; N Parkes, Burnley; B Morris, Rochdale; R Edwards, Sheffield; S Wood, Brighton; K M D'Costa, Leicester; E Mason, Hove; N Collier, Birmingham; C S Tolley, Basingstoke; P Morris, Lancashire; A Crook, Norwich; F A Beale, Dorset; A Furness, Somersham; P Ramsay, Scotland; M E Bailey, Barrow-in-Furness; R Poston, Horsham; M Richardson, Hull; D Porter, Rochford; N Bashir, Ashton-under-Lyne; L A Cook, Retford; A Dando, Wales; L Giles, Chatham; A J Paige, Tonbridge Wells; J Al-Souz, Tilbury; F A Scarr, London; P A McDermott, Ashton-under-Lyne; C Sharkey, Glasgow; A Larney, Hull; P Thompson, A Campbell, Cheltenham; M Harron, London; M McNulty, Brighouse; J Brindley, Tyne and Wear; T Clear, Harlow; K Rehsi, London; B Hanthorne, Wolverhampton; G A W Jones, Fife.

....and more winners

Here are the names of our Quicksilva competition winners. The 16 Commodore 64-owning winners were: D Allen, London; V Holmes, Birmingham; A J Brooks, Weymouth; K Lowe, Southampton; M Real, Limerick; T Richards, Oldham; K S Wyer, Preston; B Smyth, Norwich; M Stoney, Edmonton; S Khan, Birmingham; R C Gilbert, Reading; D J Williams, London.

The 16 48K Spectrum-owning winners were: N Tree, Bristol; H McGregor, Pitlochry; B Salt, Nottingham; Y K Sayania, Leeds; G Chidwick, Manchester; R J Gunton, Wolverhampton; W West, Plymouth; J Norden, Glasgow; A C Edwards, St Helens; P Goode, Malvern; N Pitamber, London; R Conacher, Leeds; M Davison, Barnstable; D Hardy, Enfield; D Quirk, Isle of Man; A F Stone, Bristol.

Alien experts

The answers approved by Mind Games in our Alien quiz were: 1. Ripley; 2. Tom Skerrit; 3. Zeta II Reticuli; 4. Jones; 5. Ash.

Here are the names of the winners: W Sutherland, Carlisle; R Miller, Newcastle upon Tyne; R P Mason, Sidcup; L M Holland, Chatham; A Butwell, Birmingham; J C Fowler, St Agnes Cornwall; J Stevenson, Watford; C Chalk, London; S Thuston, Wallington Surrey; R Wells, Wormley; M England, Cheshire; I Roscoe, Torquay; P Buckton, Borehamwood; M Manmey, Telford; J Fisher, Hoddesdon; A Fraser, Newcastle upon Tyne; L Cambell, Wallington Surrey; D Lloyd, Merseyside; G Nash, Bath; C Myerthall, Stranraer; J McLearie, Scotland; M Lallemand, Belgium; A Dobson, Accrington; T Dutton, Biggin Hill; P Harrison, Preston; D Read, Birmingham; P D Freund, Ashford; I Cassidy, Stockport; J Bell, Gosport; D R McLean, Birmingham; L Uren, Swindon; L T Daffett, Portsmouth; I Marsh, Bristol; S Sarkar, London; M Trolan, Alnwick, Northumberland; R Clark, Sutton-on-Hill; A Kauczok, Wales; R Loach, Birmingham; M R Perrett, Upminster; K Hemmer, Tyne & Wear; R Chodhury, Dunstable; S Buckingham, Cambridge; A T Green, Fife; D M Johnson, RAF Kinloss Scotland; D G Satchell, Devon; A Lawson-Clatworthy, London; K Morecroft, Long Eaton.

New bridge

Alligata this week announced that it is releasing new improved versions of Contract Bridge for the C64, BBC and Electron computers.

Contract Bridge is also being released for MSX computers.

Features included in the game are hi-resolution full card graphics, advance play routines and true random deal.

People who have already bought the old version can return it to Alligata for exchange, with a nominal handling fee of £1 for both cassette and disc. An upgrade from cassette to disc costs £3.

Alligata, 1 Orange St, Sheffield S1 4DW

Focus on computing in schools

Teachers and education specialists were out in droves at the Barbican for the High Technology and Computers in Education Exhibition. There were new ideas in software and peripherals

Official comment

Robert Dunn, undersecretary of state for education and science, officially opened the High Technology and Computers in Education Exhibition at the Barbican recently.

Acting as government spokesman, he welcomed the exhibition as 'the first which has tried to embrace the whole spectrum of educational interests.'

He mentioned that the government now has a clear idea of the state of computing in schools: 'The national picture is very good. For example, while we knew secondary schools had one micro, now we know they have on average nine micros each.' This knowledge is the result of joint research undertaken by the BBC and Microelectronics Education Programme (MEP).

Future trends, encouraged by the government, include a shift of emphasis to 16-bit machines. Mr Dunn explained: 'All our software effort has been in eight-bit machines. We need to produce material that exploits new developments and learning abilities. We are encouraging MEP to supply proposals for 16-bit software.'

Finger painting

Microtec presented its Touchtech 501 to a large audience of educational specialists and media. Harvey, the tiger cub, participated in the display via a moving and speaking figure on screen.

The Touchtech 501 is an add-on which enables you to draw with your finger on your computer screen. It's like finger-painting, but on a TV screen.

Microvitec representatives stressed that the QWERTY keyboard is unsuitable and undesirable for many computer users, like infants and disabled pupils. The Touchtech screen means the traditional keyboard can be put to one side and the user is in direct contact with the computer. No skill is required to manipulate fiddly keys.

The equipment comprises a stand, into which you fix your Microvitec colour monitor, and a bezel, containing the infra-red sensors which are projected across the screen. Whenever you touch the screen with a finger or instrument the rays are broken, and this information is fed to the computer, which interprets the data.

The Touchtech is being marketed at £210 and comes with a demo disc containing nine programs. And it's not just drawing — there are maths, music and a number of logic and skill games available. The idea is that the teacher uses the software as a starting point from which to develop his or her own software.

Microvitec, Futures Way, Boiling Rd, Bradford, W Yorks BD4 7TU

Concept Keyboard on safari

Special uses for micros

Computers have a special role to play in the education of mentally handicapped pupils. Those who have particularly severe learning problems need constant repetition to be able to absorb new knowledge.

Nordis Software, established by two psychologists working for Northamptonshire Social Services, has evolved a range of software to cope with the learning difficulties of the mentally handicapped.

Software is graded in very small steps and there are many practice items. Interest is generated by the sound and colour available on the computer, and the student is required to actively participate in the teaching process, which proves very rewarding.

The programs written by Nordis have been used in Northants for two years, and the improvement in mentally handicapped pupils has been remarkable. The company quotes one student who couldn't count, but now can, and another pupil's reading age has gone up from 5.2 years to 6.4 in just three months.

Five physically handicapped programmers are employed as programmers at Nordis, and the programs are mostly used in special schools, since research has shown that adult training centres, on the whole, aren't computerised yet.

Software is available from Nordis at £15 for both BBC disc and cassette.

Nordis Industries, Cornhill Cl, Lodge Farm Est, Hopping Hill, Northampton NN5 7UB

Tooth care

Garland Computing unveiled a new range of software for use in schools. At the top of the list is the Teeth and Dental Care program, on which Garland collaborated with the General Dental Council.

For children aged 10 and over, this program teaches about teeth and their structure, as well as diet and dental hygiene in the prevention of tooth decay.

Sound-effects and animated graphics help sustain the child's interest, while the topics studied are reinforced by a quiz. Price: £14.50 plus VAT.

Other titles include Make Sam Smile, for infants; The Saxons, a history simulation for children of eight and above; Introductory Genetics, for secondary school pupils and a range of board-type games.

Garland Computing, 35 Dean Hill, Plymouth PL9 9AF

Interface for Spectrum

The new Spectrum disc interface from **Technology Research**, helps make the Spectrum a more credible computer for serious usage.

Using the interface means that you can connect to any BBC disc drive. It can also be slotted into the Interface 1 for networking, so that you can use Microdrive and disc at the same time.

The interface uses 128 bytes of memory and is supplied with a 5¼ inch disc of utility programs. It's available in both single density and double density, at £85 plus VAT and £95 plus VAT, respectively.

Technology Research, Unit 18, Central Trading Est, Staines, Middx TW18 4XE

Abolish the keyboard

One way of getting round the problem of familiarising young children with the computer keyboard is to find an alternative, and one such alternative is the Flying Start Concept Keyboard.

This is a touch-sensitive keypad divided into 128 response areas. Different overlays can be used to match up with specific programs.

Teachers write their own programs by assigning keys to different shapes. The keyboard is available in either A4 or A3 size and is guaranteed for 12 months. Price: £109.50 and £139.50 for A4 and A3 respectively.

AB European Marketing, Forest Farm Ind Estate, Whitchurch, Cardiff CF4 7YS

Build a robot

On show at the Barbican — the **Fischertechnik** Computing Kit. With this you can build a number of computer controlled models. At £47.50, you can build a traffic light, machine tool, Tower of Hanoi, teach-in robot, to name but a few.

These are ideal for demonstrating robotics in the classroom.

Also available from Economatics: the Economatics interface, which, at £52, allows you to connect the models you've just built with your kit, to a BBC B.

Software is provided for the teach-in robot, and you can also buy a users' guide at £9.95, which provides the documentation needed.

Economatics, Epic House, 9 Orgreave Road, Handsworth, Sheffield S13 9LQ

3D shapes

One of the most unlikely exhibits at the show was **Polydron**.

Based on a childrens' toy which can be made into all kinds of 3D shapes, the reason for it's inclusion at this show was the release of a BBC computer program which can help produce the shapes, costing £15.

You have a menu of possible connections down the side of the screen and after choosing your shape you can manipulate it in various ways on screen before deciding where to connect it to the others. The spectacular part of the program is it's ability to change viewpoint and offer a drawing from any angle. Even the sides of the shape are coloured differently so that the three dimensions can be clearly seen.

We hope to feature a review of this program in a later issue of HCW.

Polydron UK, Unit 12, Staveley Way, Brixworth, Northampton

Throw your keyboard out — it's the Touchtech 501!

Commodore sponsor deal

Commodore is aiming to increase it's share of the education market with a sponsorship scheme, entitling educational establishments to buy Commodore equipment at a 30 per cent discount.

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outward bound

This week you could win two games from New Generation Software which will take you out and about

THERE'S ACTION in the wild west and excitement on the river, in the games on offer this week from New Generation. There will be 65 winners who will each receive copies of Shoot the Rapids and Cliff Hanger. Both games are available on the C64 and cost £7.95.

In Shoot the Rapids you find yourself going down a fast flowing river, as you compete in a canoe race against the clock. It is a simulation game, so many of the obstacles and problems you meet are similar to the real thing, but you don't get wet of course! There are rocks, islands, a motorboat and even the occasional beaver to avoid. It will take a bit of skill to get the hang of the paddle action, and look out for strong currents in the middle of the river. If you miss any gates during the course, a time penalty is added at the end, and you may fail to qualify, so it's no good trying to cheat. Another thing to remember is, that just like real canoeing, you only have one life. There are several levels of difficulty, so you'll need practice to build up your skill.

Cliff Hanger is a wild west game with a cartoon style sense of humour. As Cliff, the hero, you must try and stop the bandit shooting-up the canyon. There are 50 screens, and the game is for one or two players. In your attempts to stop the bandit, you will have a variety of objects available, including boulders, a cannon and a see-saw. Sometimes you will have to use them together, sometimes separately: it's up to you to find out. The game becomes progressively more difficult, and at the final level you must succeed at each stage or you lose a life. In certain circumstances the computer will take complete control, and you can sit back and enjoy the hilariously funny goings-on.

If you've got a sense of fun, or a yearning for danger, these games are for you. Try and spot the differences in the wild west picture and you could be a winner.

How to enter

Study the two cartoons — there are a number of differences between them. Circle the differences on cartoon B and seal the cartoon and coupon in an envelope. Write clearly the number of differences you found on the back of the envelope.

Post your entry to: New Generation Competition, Home Computing Weekly, No. 1 Golden Square, London W1R 3AB. Closing date is at first post on Friday February 22, 1985.

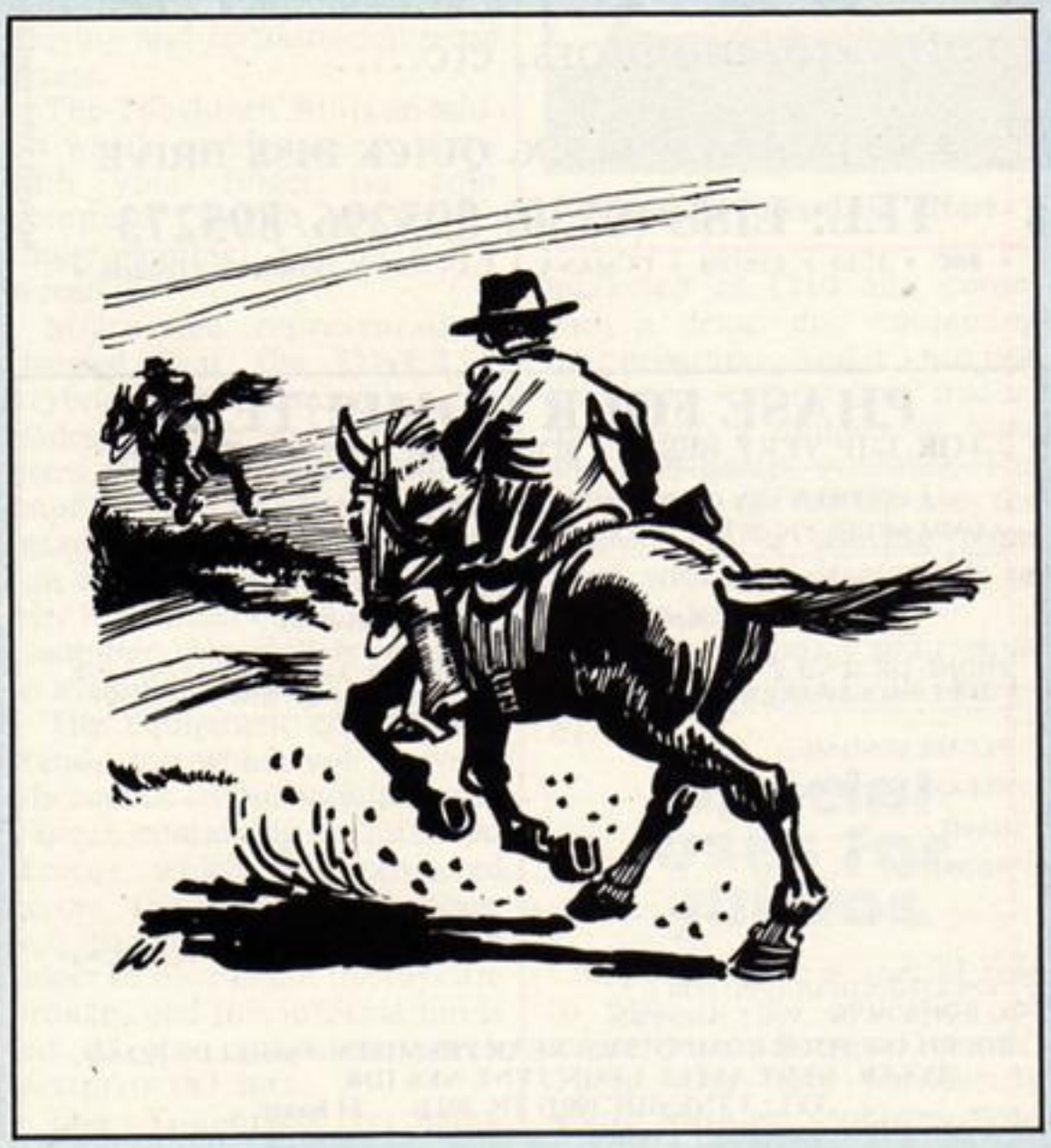
You may enter as many times as you wish, but each entry must be on an official coupon — not a copy — and sealed in a separate envelope.

Important: please follow carefully the guidelines on entering — incomplete coupons and entries in envelopes with no numbers on the back cannot be considered. If you are a winner, the coupon will be used as a label to send your prize, so clear writing is essential.

The rules

Entries will not be accepted from employees of Argus Specialist Publications, New Generation Software and Alabaster Passmore & Sons. This restriction also applies to employees' families and agents of the companies.

The How to Enter section forms part of the rules.



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Complete clearly and fully — if you are a winner this will act as a label for your prize. Post to New Generation Competition, Home Computing Weekly, No.1 Golden Square, London W1R 3AB. Closing date: first post, Friday February 22, 1985. Don't forget to follow closely the advice in the How to Enter section, including writing the number of differences found on the back of your envelope.

Deduction

SPECTRUM PROGRAM

As its name implies, this game tests your powers of deductive logic.

You are charged with the task of working out the colours of a number of pegs, chosen at random.

You can determine the level of dificulty by choosing the number of pegs (2-8), the number of different colours (2-7), from which the pegs may be shaded, and by stating how many attempts (2-9) at deducing the combinations you wish to make.

As a guide to difficulty, the screen will show the betting odds against randomly uncovering the correct colour combination within the number of guesses chosen.

After each guess you wil be given a score which provides the basis for deducing improvements for the next guess.

A slashing point is given for every correctly placed colour, and a white point for every wrongly placed but correct colour. The snag is that the score does not show which pegs are the right ones and which are wrong... that's for you to work out by deduction.

Variables

sec display rate
a() colour array
b() guess array
c number of colours
p number of pegs
guesses allowed number of guesses
bk, wt scores
d colour guess

How it works

5-60 instructions
70-190 scoring
200-360 input difficulty
362 print odds
363-580 input guess
600 check score
820-850 correct
860-1200 incorrect — show score
1200 back to 363 if incorrect
1220-1350 restart menu
1500 failed, show solution

You'll need to use logical thinking in this game. It's all a process of elimination — but are you smart enough to work it out? By D A Carter

```
  5 CLS : LET sec=40
 10 PRINT AT 0,11; PAPER 2; INK 9;"DEDUCTION"
 15 INPUT "Do you need the rules explained?"'"ENT
ER Y or N   ";a$
 16 IF a$="N" OR a$="n" THEN  GO TO 300
 20 PAUSE sec: PRINT AT 3,0;"The computer will de
cide the"'"colours of a number of pegs, "'"but it
will keep the colours and"'"their order a secret.
Your job"'"is to work out the colours and"'"their
order. e.g:"
 25 PAUSE 5*sec: FOR i=1 TO 7: LET k=INT (1+7*RND
): PRINT AT 10,7+2*i; PAPER k; BRIGHT 1; INK 9;k:
NEXT i
 30 PAUSE 5*sec: PRINT '"You guess one peg at a t
ime by"'"pressing the colour numbers 1-7.";: PAUSE
 sec*3: PRINT "Try pressing some colours now."
 35 FOR i=1 TO 6: PRINT AT 16,8+2*i;"0": NEXT i
 40 LET c=7: FOR i=1 TO 6: GO SUB 2000: PRINT AT
16,8+2*i; PAPER d; INK 9; BRIGHT 1;d;: NEXT i
 50 PRINT '"You can chose how many colours,"'"and
 pegs the computer can"'"use, and how many guesses
 to"'"allow yourself."
 60 PAUSE 10*sec: INPUT "Press ENTER to continue.
"; LINE a$
 70 CLS : PRINT AT 0,10;"SCORING"''
 80 PRINT "A FLASH * score is given for"'"every g
uess of the right"'"colour in the correct position
.": PAUSE 5*sec
```

Deduction

```
 90 PRINT '"A WHITE ";"*";: PRINT " score is give
n for any"'"guesses which may be right"'"colours b
ut which are in the"'"wrong position."
 100 PAUSE 5*sec
 110 PRINT AT 10,0;"COMPUTER:"
 120 PRINT AT 12,0;"GUESS   :"
 130 PRINT AT 14,0;"SCORE   :"
 140 DIM a(8): FOR i=1 TO 8: READ a(i): PRINT AT 1
0,10+2*i; PAPER a(i); INK 9; BRIGHT 1;a(i): NEXT i
: DATA 1,2,3,4,5,6,7,7
 160 FOR i=1 TO 8: READ a(i): PRINT AT 12,10+2*i;
PAPER a(i); INK 9; BRIGHT 1;a(i): NEXT i: DATA 6,2
,1,7,5,4,4,3
 165 RESTORE
 170 PRINT AT 14,12;"********"
 180 PAUSE 10*sec: PRINT '"Note the score only sho
ws how"'"many pegs are right; it does"'"not show w
hich are right."
 190 INPUT "Press ENTER to continue: "; LINE a$
 200 CLS
 300 REM setting up
 310 INPUT "How many PEGS (2-8):  ";p
 320 IF p<2 OR p>8 THEN  GO TO 310
 330 INPUT "How many COLOURS (2-7): ";c
 340 IF c<2 OR c>7 THEN  GO TO 330
 350 INPUT "How many GUESSES (2-9): ";guesses
 360 IF guesses<2 OR guesses>9 THEN  GO TO 350
 362 CLS : PRINT AT 10,0;"Chance of guessing solut
ion in "';guesses;" attempts: "'''';INT ((p^c)/gues
ses);":1 against"
 363 INPUT "Press ENTER to continue."; LINE a$
 370 LET k=0: LET k1=0
 380 DIM a(p): DIM b(p): DIM c(p)
 390 FOR i=1 TO p: LET a(i)=INT (1+c*RND): NEXT i
 500 REM the game
 510 CLS : PRINT AT 0,12; PAPER 2; INK 9;"DEDUCTIO
N"
 511 PRINT AT 1,25;"score"
 512 FOR i=1 TO p
 513 FOR j=1 TO guesses
 514 PRINT AT 2*j,32-i;"O"
 515 PRINT AT 2*j,1+2*i;"O"
 516 NEXT j: NEXT i
 520 FOR g=1 TO guesses
 530 PRINT AT 2*g,0;g
 540 FOR i=1 TO p
 550 PRINT AT 21,0;"Guess peg "(i);" (1-";(c);") :
"
 560 GO SUB 2000
 570 LET b(i)=d: PRINT AT 2*g,1+2*i; PAPER b(i); I
NK 9; BRIGHT 1;d
 580 NEXT i
 600 REM check the guess
 610 LET k=k+1: LET bk=0: LET wt=0: FOR i=1 TO p:
LET c(i)=a(i): NEXT i
 620 FOR i=1 TO p
 630 IF b(i)=c(i) THEN  LET bk=bk+1: LET c(i)=-1:
LET b(i)=-2
 640 NEXT i
```

PROGRAM

```
  650 REM find the whites
  660 FOR i=1 TO p
  670 IF b(i)=-2 THEN  GO TO 730
  680 FOR j=1 TO p
  690 IF b(i)=c(j) THEN  LET wt=wt+1: LET c(j)=-1:
LET j=p
  700 NEXT j
  730 NEXT i
  800 REM do the scores
  810 IF bk<>p THEN  GO TO 1000
  820 REM SOLVED IT
  830 PRINT AT 2*g,22; FLASH 1; INK 2;"WELL DONE!":
  PRINT AT 21,0;"                                  "
  840 FOR i=1 TO 6: BEEP .1,i: NEXT i
  850 INPUT "Press ENTER to continue. "; LINE a$
  860 LET g=guesses: GO TO 1200
 1000 REM show score
 1010 IF bk=0 THEN  GO TO 1100
 1020 FOR i=1 TO bk
 1030 PRINT AT 2*g,31-bk-wt+i;"*"
 1040 NEXT i
 1100 IF wt=0 THEN  GO TO 1200
 1110 FOR i=1 TO wt
 1120 PRIN AT 2*g,31-wt+i;"* "
 1130 NEXT i
 1200 NEXT g
 1210 IF bk<>p THEN  GO TO 1500
 1220 REM restart
 1230 CLS
 1240 PRINT AT 0,10; PAPER 5; INK 2;"DEDUCTION"
 1250 PRINT AT 5,3;"1=RESTART"
 1260 PRINT AT 6,3;"2=CHANGE PEGS etc."
 1270 PRINT AT 7,3;"Q=END OF GAME"
 1280 PRINT AT 8,3;"N=NEW PLAYER"
 1290 IF INKEY$<>"" THEN  GO TO 1290
 1300 IF INKEY$="" THEN  GO TO 1300
 1310 IF INKEY$="1" THEN  GO TO 380
 1320 IF INKEY$="2" THEN  GO TO 300
 1330 IF INKEY$="q" THEN  STOP
 1340 IF INKEY$="n" THEN  GO TO 370
 1350 GO TO 1290
 1500 REM failed to solve
 1510 PRINT AT 21,0;"                                  "
 1520 FOR i=1 TO p
 1530 PRINT AT 21,1+2*i; BRIGHT 1; PAPER a(i); INK
 9;a(i)
 1540 NEXT i
 1550 PRINT AT 21,20; FLASH 1; INK 1;"<<< SOLUTION"
 1560 FOR i=1 TO 10: BEEP .1,-i: NEXT i
 1570 INPUT "Press ENTER to try again "; LINE a$
 1580 GO TO 1220
 1999 STOP
 2000 REM colour input
 2010 IF INKEY$<>"" THEN  GO TO 2010
 2020 IF INKEY$="" THEN  GO TO 2020
 2030 IF INKEY$<"1" OR CODE INKEY$>c+48 THEN  GO TO
  2010
 2040 LET d=VAL INKEY$: BEEP .1,d
 2050 PAUSE 10: RETURN
```

Page 80

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'Incredibly frustrating!' – that's the verdict on Cassette-50's FROGGER. Satisfied users tell us it's one of the most challenging you'll find – it's almost as good as the arcade version! CARGO has you trying desperately to complete your helicopter mission under attack. Plus 48 other tactical, logical and adventure games featuring multi-coloured and user-defined graphics, scrolling and full use of the Spectrum sound capabilities.

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35. Field
36. Draggold
37. Space Search
38. Inferno
39. Nim
40. Voyager
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42. Blitz
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44. Mystical Diamonds
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48. Barrel Jump
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50. Space Mission

ATARI

Munch, Munch . . . it's the MAZE EATER! Can you eat the ghosts before they eat you? Or would you rather chance it on the MOTORWAY? Your Cassette-50 is compatible with the 400/800 and 600XL/800XL series ATARI computers. Advanced features include high-resolution graphics, sound, music and mixed mode screens. Many games are joystick compatible.

DRAGON 32

If you like the light cycles of TRON, you'll love JETMOBILE – a thrilling 2-player game featuring high speed graphics. More special features include smooth scrolling, high resolution graphics, sound and music, plus many games are joystick compatible.

COMMODORE 64 (fast turbo load)

Only you can save Europe from destruction! It's ROCKET LAUNCH, the thrilling war game that reproduces a European map. More ambitious? Try rescuing your crew under an ultrafast GALACTIC ATTACK and escaping back to your spaceship! Just two of the great games on your Cassette-50, featuring high resolution and user-defined graphics, sprites, sound and music

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3. Space Mission
4. Lunar Landing
5. Plasma Bolt
6. Startrek
7. Radar Landing
8. Attacker
9. Galactic Dog Fight
10. Psion Attack
11. Ivasive Action
12. Noughts & Crosses
13. Boggles
14. Pontoon
15. Ski Jump
16. Hangman
17. Old Bones
18. Thin Ice
19. Orbitter
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Will it be BALLOON DODGERS, or the prizewinning DUSTMAN DAN? Play these and 40 other fabulous games – including many automatic double loaders – on your unexpanded 3.5K VIC-20. And with an 8K* or 16K expansion cartridge you can choose from 8 additional games like STAR TREK or SKULL CASTLE. Special effects user-defined graphics, super sound and music.**

APPLE

Can you land your jet with nothing but a radar projection to guide you as you wrestle with the controls? High-resolution graphics make RADAR LANDING a real thriller. And Cassette-50 gives you 49 other great games to choose from including a classic STAR TREK and blazing INFERNO.

BBC A/B

An advanced computer like the BBC demands a sophisticated games cassette. That's why Cassette-50 gives you full use of screen modes with high resolution colour graphics, user-defined graphics, excellent sound and music, joystick compatibility and many high-speed games. HIGH RISE gives you the chance to beat a realistic roulette wheel, with all the extras, and you'll need the fastest reactions of all to beat IVASIVE ACTION as you trail across the screen in a frantic search for oxygen. With multi-levels and superb graphics this game is totally addictive.

ELECTRON

Can your FORCE FIELD protect the city from Alien Attack – or maybe you have the skill to DYNAMITE the dam and flood enemy headquarters! Fifty different games with high speed, high resolution colour graphics, user-defined graphics and excellent sound and music. Not to mention full use of screen modes. Fifty fast-paced, fascinating games.

ZX81

Even a small computer gets more from Cassette-50! You can run 39 games on just the basic 1K ZX81, while 11 more will play with the addition of a 16K expansion pack. Where else could you watch your radar instruments and judge your final approach in games like RADAR LANDING – a realtime flight simulator, or enjoy the thrills of PSION ATTACK. Logical, tactical, maze, arcade – all kinds of games on just one tape!

ORIC ATMOS

Have a go at GALACTIC ATTACK – you'll need fast reactions to beat the invaders in this all-time favourite – or if you prefer you can travel through space at warp factor 9 in SPACE MISSION, a realistic 3-D version of space warfare as seen from the cockpit of a spacecraft. Everyone has a favourite game on Cassette-50. With fifty classic and original games featuring user-defined graphics, sound effects and increasing levels of play.

ORIC 1

It's the dreaded MAZE EATER! Can you safely negotiate your man through levels of mazes? Watch out, it's really tough! Or would you prefer PLASMA BOLTS, a superb high speed version of the classic arcade Centipede game. Maybe you'd rather leap straight into SKI JUMP, or any of 47 other exciting games featuring sound effects and user-defined graphics.

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Cascade Games Ltd.,
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Telephone: (0423) 504526. *Registered Number 1755554*

Character definer

Mark Zajac's utility enables you to design UDGs on your Amstrad CPC464. It uses text windows so you can see four characters at once

This program will help you design user defined graphics on your Amstrad CPC464. It uses text windows, which means that four characters can be seen on screen at any one time.

How it works

40-80 define colours and windows
80-140 input routines
150-190 draw grid in chosen window, set colours
200-240 define variables, scan keyboard for input
250-280 print block, advance to next column
280-380 calculate row value
390-430 print row value, advance to next row, check for completed grid
430-470 print space, advance to next column
480-550 define grid position
560-600 print defined character

Variables

DIM f (8) stores eight numbers used to define character
w window number
p paper colour
i pen colour
y column number
n row number
t value of row

Hints on conversion

This program will be very hard to convert to machines with no facilities for creating windows. You could create four sub-routines for controlling the position of the cursor depending on which grid has been chosen.

CHR$ (243) =→
CHR$ (242) =←
CHR$ (143) =■

The PRINT CHR$ (&1E) instruction in line 190 moves the cursor to the top left hand corner of the window.
The SYMBOL instruction denotes which character in the character set is to be redefined and is followed by the eight numbers making up the new character.

```
10 REM        GRAPHIC DEFINER
20 REM         BY MARK ZAJAC
30 REM           11.11.84.
40 MODE 1:BORDER 26:INK 0,26:INK 1,0:PEN 1:PAPER 0
50 CLS:DIM f(8)
60 WINDOW #1,1,15,13,3:WINDOW #2,26,40,13,3:WINDOW
 #3,1,15,25,15:WINDOW #4,26,40,25,15:WINDOW #5,7,3
5,3,1
70 WINDOW SWAP 5,0
80 CLS:INPUT "ENTER WINDOW NUMBER (1-4)";w
90 IF w<1 OR w>4 THEN 80
100 CLS:INPUT "ENTER PAPER COLOUR (0-26)";p
110 IF p<0 OR p>26 THEN 100
120 CLS:INPUT " ENTER INK COLOUR (0-26)";i
130 IF i<0 OR i>26 THEN 120
140 CLS:PRINT "    1 =FOREGROUND COLOUR":PRINT "
  3 =BACKGROUND COLOUR"
150 WINDOW SWAP 5,0:WINDOW SWAP w,0
160 ON w GOSUB 480,500,520,540
170 LOCATE 3,11:PRINT CHR$(243);"   ";CHR$(242)
180 INK 2,i:INK 3,p
190 PRINT CHR$(&1E)
200 t=0:y=0:n=1
210 a$=INKEY$
220 IF a$="3" THEN 430
230 IF a$="1" THEN 250
240 GOTO 210
250 y=y+1
260 PEN 2:PRINT CHR$(143);
270 SOUND 1,30,10
280 IF y=8 THEN GOTO 380
290 ON y GOSUB 310,320,330,340,350,360,370
300 GOTO 210
310 t=t+128:RETURN
320 t=t+64:RETURN
330 t=t+32:RETURN
340 t=t+16:RETURN
350 t=t+8:RETURN
360 t=t+4:RETURN
370 t=t+2:RETURN
380 t=t+1
390 f(n)=t:n=n+1:y=0
400 PEN 1:PAPER 0:PRINT " ";t:t=0
410 IF n=9 THEN 560
420 GOTO 210
430 y=y+1
440 PAPER 3:PRINT " ";
450 SOUND 1,60,10
460 IF y=8 THEN 390
470 GOTO 210
480 CLS:FOR k=223 TO 351 STEP 16:ORIGIN 0,k:DRAW 1
28,0:NEXT k
490 FOR k=0 TO 128 STEP 16:ORIGIN k,223:DRAW 0,128
:NEXT k:RETURN
500 CLS:FOR k=223 TO 351 STEP 16:ORIGIN 400,k:DRAW
 128,0:NEXT k
510 FOR k=400 TO 528 STEP 16:ORIGIN k,223:DRAW 0,1
28:NEXT k:RETURN
520 CLS:FOR k=31 TO 159 STEP 16:ORIGIN 0,k:DRAW 12
8,0:NEXT k
530 FOR k=1 TO 129 STEP 16:ORIGIN k,31:DRAW 0,128:
NEXT k:RETURN
540 CLS:FOR k=31 TO 159 STEP 16:ORIGIN 400,k:DRAW
128,0:NEXT k
550 FOR k=400 TO 528 STEP 16:ORIGIN k,31:DRAW 0,12
8:NEXT k:RETURN
560 SYMBOL 240,f(1),f(2),f(3),f(4),f(5),f(6),f(7),
f(8)
570 LOCATE 5,11
580 PAPER 3:PEN 2:PRINT CHR$(240)
590 PAPER 0:PEN 1
600 WINDOW SWAP w,0:GOTO 70
```

Animal crackers

A pageful of animal programs. Read on and meet some very odd characters

Toy Bizarre
48K Spectrum
£7.99

Activision, 15 Harley House, Marylebone Rd, London NW1

This really is a weird game. The plot is weird, the graphics are weird, and it feels weird.

You play Merton, who has been locked into a toy factory and is trying to close valves so the toys don't escape. Why do toys escape from valves I hear you ask.

Because toys come from balloons that escape from valves, is my quick reply.

Your enemy in this endeavour is Hefty Hilda, who wanders around in her pinny turning the valves on again, and I'm convinced that she is plain evil. The valves are always opened within seconds of turning them off.

. The game is quite interesting, but is little more than another ladder and level clone. There is very little that makes it stand out from the crowd however.

The instructions are particularly poor in that they don't explain an number of the game's features. There is no mention of 'coffee breaks' and scant coverage of 'safety checks'.

In a game as weird as this every little bit of help is needed. Perhaps I'm just too old for toys! **D.C.**

instructions	50%
playability	80%
graphics	70%
value for money	70%

★ ★ ★

Show Crazy
CBM 64
£2.95

Ssoft, telephone 061 973 1097

This adventure has been on sale for a while to raise money for cat leukemia. It was advertised only in cat enthusiasts' magazines. Such has been it's success that they are now considering selling it to a wider market.

The object is certainly different. No rescuing maidens, killing dragons or exploring underground mazes. It is the day of the Cat Show and your beloved animal, called Pest, is missing. You have to find him, catch him and get him safely to the show.

The author used the Quill, and as a first attempt it's quite good.

The thing that irritated me most was the response, 'you can't do that at the moment'. This cropped up frequently and I expected it to mean that, given the right conditions, it can be done. No so; 'climb floor' or 'open fffff gives that. Similarily, 'examine' can give 'I see nothing strange about it', even if the object is not there.

But let's not quibble too much. Originally sold at £5.95, now it's £2.95 and you can pay a lot mroe for a lot worse program. **B.J.**

instructions	70%
playability	80%
graphics	60%
value for money	92%

★ ★ ★

Hellion
Oric/
Atmos 48K
£6.95

Orpheus, The Smithy, Church Farm, Hatley St, George, Nr Sandy, Beds

After loading a detailed picture of a wasp in hi-res, the huge main program proceeded to load. Apparently, you control the Hellion, a special form of mutant wasp, in a bid to destroy waves of marauding insects.

You start the game with three shields, a new one is awarded every ten thousand points up to a maximum of five. The strength of this — indicated at the bottom of the screen — decreases as you are hit by the missiles released by these hideous insectoids. You can move vertically as well as horizontally and you can fire missiles in the usual shoot-'em-up fashion.

What makes Hillion a class above the rest is it's variety of enemies. There are 101 successive screens of differing insectoids, each with it's own flight pattern.

The game is ridiculously fast and mean. Not only that, the presentation is also very high quality with options such as variable volume, redefinable control keys, quit game and a facility to start a new game from the highest level achieved in previous games. All in all, a very high quality program. **S.S.**

instructions	80%
playability	90%
graphics	90%
value for money	90%

★ ★ ★ ★ ★

Knightmare
CBM 64
£6.99

Romik, 272 Argyll Ave, Slough SL1 4HE

Do you like adventures or do you prefer arcade games? Well Knightmare is both.

You take the part of a drunken knight, Sir Legless, trying to rescue King Eric and the other knights who have been imprisoned by the wizard Anthrax. Your 80-room castle is now filled with an amazing variety of evil spirits, or should I say sprites, that you must battle through. Some ghouls cannot be killed without special equipment, or rooms entered without the right key. Therein lies the adventure.

You'll need to map the castle so that, for example, you can get the fly spray from the broom cupboard, to kill the bees in the apiary and so get the blue key for the blue door.

To start, you purchase a crossbow, armour and shield. The more you spend, the more effective they'll be, but the less energy you'll have. During your search for Anthrax, there are treasures to collect, as well as a limit to the number of items you can carry. When you're really stuck, there's a help line to phone, and John might give you a hint.

Nice one, Romik! **B.J.**

instructions	95%
playability	93%
graphics	90%
value for money	95%

★ ★ ★ ★ ★

Bumble Bee
CBM 64
£7.95

Micro Power, Sheepscar Hse, 15 Sheepscar St South, Leeds LS7

When I first saw this game I thought it was another version of Pacman with different characters, but it isn't quite, because the maze where your bee appears to be, isn't really a maze at all. What look like solid walls are actually turnstiles, which you can fly through at will; they only represent barriers to the spider which is pursuing you.

Much of the skill lies in spinning these turnstiles into positions which make it impossible for the spider to reach you, so you can eat the pollen dots in peace.

Apart from that, it's the usual business of chasing around eating the dots and pieces of fruit while avoiding the nasty spiders, toadstools and fire barrels. When you succeed in clearing a screen, an exit appears to take you to the next almost identical screen.

The graphics are attractive enough, the music is quite pleasant and there are both keyboard and joystick options, but there is only one skill level. It's quite fun to play, but perhaps more suitable for newcomers to arcade games than for the real experts. **M.N.**

instructions	80%
playability	65%
graphics	80%
value for money	70%

★ ★ ★

Toddler's teach-in

This educational program is intended for four to seven-year-olds. John Wright gives you comprehensive details of what it does and how it works

This program was written for my six year old son and is now intended for four- to seven-year-olds. Some parental help at first is recommended. I wanted a simple program which would give familiarity with a computer but at the same time have some educational value.

Variables
0, 01 music octave
B, B1 note length
H number array
Q, W, X, Y, Z plotting co-ordinates
SC, SC$ score variables
C$ cat
N, N1 music note
C count
G high/low number check
X$ (1-6) user defined grapics
M$ mouse

How it works
Initialisation
5 selects screen mode
10, 20 switch off cursor, key click and capitals
30-40 redefine music variables
70 allocate UDG (user defined graphics)
100 load music variables arrays
110 redefine user grapics
160-175 sub-routine to allow any length key press without using INPUT
200 display title page

Control menu
210-360 displays menu choices
370-400 error trapped menu choice selection

Keyboard practice
1000-1490 display screen
1500-1520 flash new key character
1530-1610 get key press and move cat/mouse accordingly
1700-1760 cat catches mouse end routine
1800-1995 mouse through hole end routine

Adding
2000-2160 display screen
2170-2250 display two random lines of UDGs to be added
2270-2630 checks for right/wrong answer, or correct answer needed
2700-2720 increase and display score
2800-2870 unplot UDGs
2880-2890 control count
2900 check for well done sub-routine
2950-2970 unplot message sub-routine

Taking away
3000-3970 mostly as adding, but colours changed and obvious alterations for taking away instead of adding

Smallest
4000-4170 display screen
4180-4270 get four new numbers and display them
4280-4310 work out which is smallest number
4320-4640 checks for right/wrong answer, or correct answer needed
4700-4730 increase and display score
4800-4870 unplot four numbers
4880 control count
4885 check for well done sub-routine
4900-4920 unplot message sub-routine

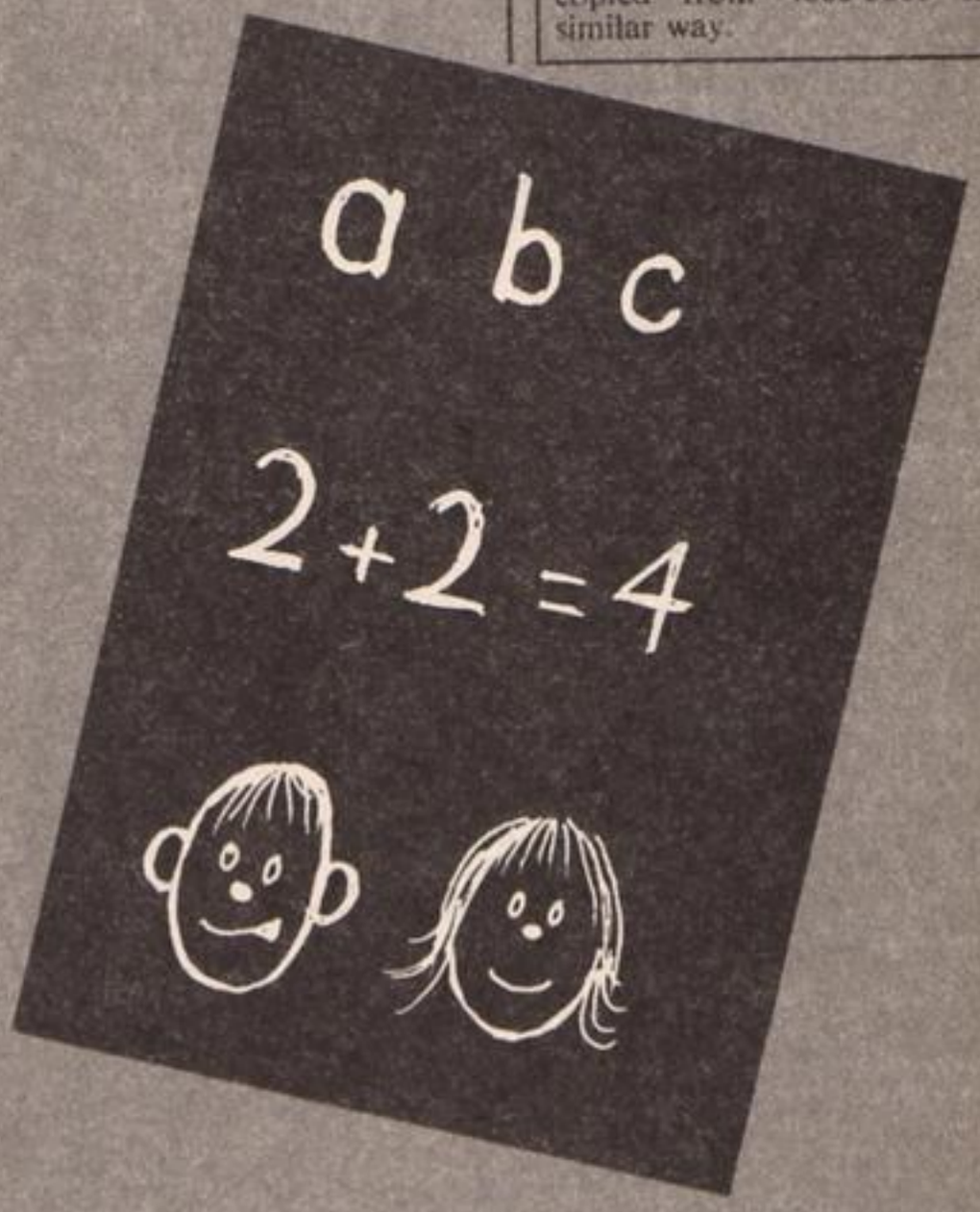
Biggest
5000-5920 mostly as smallest, but colours changed and obvious alterations for biggest rather than smallest

Subroutines etc
6000-6170 load music arrays
10000-10130 display title page
10140-10200 go sub to play tune then return
10500-10530 play menu tune subroutine
11000-12000 redefine user graphics (UDGs)
12000-12150 well done message and tune subroutine

Hints on convesion
CLS clears screen
PLOT same as PRINT AT
INK/PAPER foreground/background colours
MUSIC plays tunes (channel, octave, note, loudness) followed by WAIT
WAIT same as PAUSE
PLOT X,Y attribute code or CHR$ code

Attributes or CHARS codes
0-7 foreground colours
10 and 14 double height and DH flash
16-23 background colours

General
Sections 3000-4000 can mainly be line copied from 2000-3000 with tch necessary colour and script changes, along with alterations for taking away.
Section 5000-6000 can be line copied from 4000-5000 in a similar way.




```
5 TEXT
10 CLS:POKE618,10
20 PRINTCHR$(20)
30 FOR I=46856TO46863
35 READ D:POKEI,D:NEXT I
40 DATA0,0,30,34,34,38,26,0
50 DIM0(22),N(22),B(22)
60 DIM01(30),N1(30),B1(30)
70 X$(1)="[\":X$(2)="^_":X$(3)="]":X$(4)="%&":X$(5)="
?@":X$(6)="(;"
100 GOSUB 6000
110 GOSUB11000
150 GOTO200
160 B$="":S$=MID$(STR$(S),2)
165 FORJ=1TO LEN(S$)
170 GETA$:B$=B$+A$:NEXTJ
175 B=VAL(B$):RETURN
200 GOSUB 10000
210 CLS:PAPER5:INK0
220 X=2:Y=2
230 FORI=1TO22
240 PLOTX,Y,22:PLOTX+34,Y,21
250 Y=Y+1:NEXTI
260 PLOT12,3,10:PLOT12,4,10
270 PLOT14,3,"  Menu  "
280 PLOT14,4,"  Menu  "
290 PLOT14,5,"  ----  "
300 PLOT8,8,"1.  Keyboard practice"
310 PLOT8,10,"2.  Adding"
320 PLOT8,12,"3.  Taking away"
330 PLOT8,14,"4.  Smallest"
```

```
340 PLOT8,16,"5.  Biggest"
350 PLOT8,20,12:PLOT9,20,4
360 PLOT10,20,"Please choose 1-5"
370 GET A$:A=VAL(A$)
380 IF A=>1 AND A<=5 THEN 398
390 ZAP:PLOT11,22,"ERROR TRY AGAIN!"
395 WAIT100:PLOT11,22,"                    ":GOTO370
398 GOSUB 10500
400 ON A GOTO 1000,2000,3000,4000,5000
410 END
1000 CLS:PAPER3:INK4
1005 PRINT CHR$(20):POKE48035,0
1010 PLOT2,1,10:PLOT2,2,10
1020 PLOT10,1,"Keyboard Practice"
1030 PLOT10,2,"Keyboard Practice"
1035 PLOT10,3,"------------------"
1040 PLOT2,5,CHR$(10)+CHR$(1)
1050 PLOT2,6,CHR$(10)+CHR$(1)
1070 PLOT4,5,"press the key when it flashes"
1080 PLOT4,6,"press the key when it flashes"
1085 X=14:Y=8
1090 FORJ=1TO8
1100 PLOTX,Y,20:PLOTX+9,Y,19
1110 Y=Y+1:NEXTJ
1120 X=15:Y=9
1125 FORJ=1TO6
1130 PLOTX,Y,22:PLOTX+7,Y,20
1140 Y=Y+1:NEXTJ
1150 PLOT2,11,CHR$(0)+CHR$(14)
1160 PLOT2,12,CHR$(0)+CHR$(14)
1200 C$=CHR$(10)+"?@"
1210 M$=CHR$(8)+"(:"
1220 PLOT2,23,CHR$(10)+CHR$(0)
1230 PLOT2,24,CHR$(10)+CHR$(0)
1235 W=48800
1240 X=0:Y=19:FORJ=1TO6
1245 POKEW,18:W=W+40
1250 PLOTX,Y,18:PLOTX+4,Y,22
1260 PLOT X+31,Y,16:PLOTX+32,Y,22:PLOTX+34,Y,18
1270 Y=Y+1:NEXTJ
1275 POKE48760,16
1280 PLOT6,23,C$:PLOT6,24,C$
1290 PLOT12,24,M$
1300 PLOT27,23,"<":PLOT28,23,">"
1310 PLOT27,24,"**"
1320 PLOT31,24,"O"
1325 POKE49040,17:POKE49080,17
1330 PLOT 0,25,17:PLOT0,26,17
1490 Y=24:Q=6:X=12
1500 N=INT(RND(1)*43)+47
1510 IFN=>58ANDN<=64 THEN N=90
1520 PLOT18,11,N:PLOT18,12,N
1530 GET S$
1550 IFASC(S$)=N THEN 1560 ELSE 1580
1560 PLOTX,Y,"  ":X=X+2:PLOTX,Y,M$
1565 IF SCRN(X+3,Y)=42THEN 1800
1570 PING:GOTO1610
1580 PLOTQ,Y-1,"  ":PLOTQ,Y,"  "
1585 Q=Q+2
1590 PLOTQ,Y-1,C$:PLOTQ,Y,C$:ZAP
1600 IF SCRN(Q+3,Y)=123THEN 1700
1610 WAIT 100:GOTO1500
1700 WAIT20:PLOTX-1,Y-1,"  ":PLOTX-1,Y,"  "
1710 X=X+1
1720 PLOTX,Y-1,C$:PLOTX,Y,C$
1730 SOUND 5,0,0
1740 PLAY 2,2,1,3000
1750 PLOT6,20,CHR$(0)+CHR$(12)+"MMmmm.. I like Mice"
1760 WAIT 600:GOTO1990
1800 WAIT100:PLOTX,Y,"  "
1810 X=X+1:PLOTX,Y,CHR$(8)+"("
1820 WAIT100:PLOTX,Y,CHR$(8)+" "
1830 WAIT100
1840 X=0:Y=19:W=48800:Z=48801
1850 FORJ=1TO6
1860 PLOTX,Y,"                                    "
1870 POKEW,16:POKEZ,3
1880 Y=Y+1:W=W+40:Z=Z+40:NEXTJ
1890 X=X+2:Y=Y-1:PLOTX,Y,M$
1895 PLOT 33,Y-2,"<*"
1900 PLOT 32,Y-1,"<**"
1910 PLOT 31,Y,"<***"
1920 FOR J=1TO26
1925 PLOTX,Y," ":X=X+1
1930 PLOTX,Y,M$:WAIT10:NEXTJ
1940 WAIT100:PLOTX+3,Y," ":X=X+1
1950 PLOTX-1,Y," ":PLOTX,Y,M$
1960 PLOT 5,20,CHR$(12)+"MMmmm..  Lovely Cheese"
1970 WAIT 500
1990 PRINT CHR$(20)
1995 GOTO 210
2000 CLS:PAPER6:INK5
2010 PLOT2,1,CHR$(4)+CHR$(10):PLOT2,2,CHR$(4)+CHR$(10)
2020 PLOT5,1,"Adding":PLOT5,2,"Adding"
2025 PLOT25,1,"Score: ":PLOT25,2,"Score: "
2030 C=0:S=0:SC=0:SC$=MID$(STR$(SC),2):S$=MID$(STR$(S)
,2)
2035 PLOT32,1,SC$:PLOT32,2,SC$
2040 REPEAT
2050 X=1:Y=5:F=0
2060 FORJ=1TO3
2070 PLOTX,Y,16:PLOTX+36,Y,22
2080 Y=Y+1:NEXTJ
2090 X=17:Y=10:PLOT10,11,10:PLOT10,12,10
2100 FORJ=1TO4
2110 PLOTX,Y,16:PLOTX+3,Y,22
2120 Y=Y+1:NEXTJ:PLOT18,11,"+":PLOT18,12,"+"
2130 X=1:Y=16
2140 FORJ=1TO3
2150 PLOTX,Y,16:PLOTX+36,Y,22
2160 Y=Y+1:NEXTJ
2170 K=INT(RND(1)*3)+1:L=INT(RND(1)*10)+1:M=INT(RND(1)
*10)+1
2180 W=5:Z=6
2190 FORI=1TOL:PLOTW,Z,X$(K)
2200 W=W+3:NEXTI
2210 W=5:Z=17
2220 FORJ=1TOM:PLOTW,Z,X$(K)
2230 W=W+3:NEXTJ
2240 PLOT2,21,CHR$(4)+CHR$(14):PLOT2,22,CHR$(4)+CHR$(1
4)
2250 PLOT15,21,"Answer =":PLOT15,22,"Answer ="
2270 S=L+M:GOSUB 160
2275 IF B=>1 AND B<=20 THEN 2300
2280 ZAP:PLOT9,24,CHR$(1)+"ERROR TRY AGAIN!":WAIT200
2290 PLOT8,24,"                    ":GOTO2270
2300 IFB=S THEN 2500
2310 IFF=1THEN 2600
2320 F=1:PLOT2,22,CHR$(1)+CHR$(14)
2325 PLOT2,21,CHR$(1)+CHR$(14):PLOT2,22,CHR$(1)+CHR$(1
4):GOSUB2950:ZAP
2330 PLOT8,21,"Sorry wrong, try again"
2335 PLOT8,22,"Sorry wrong, try again":WAIT200
2340 GOTO2270
2500 PLOT2,21,CHR$(4)+CHR$(10):PLOT2,22,CHR$(4)+CHR$(1
0):GOSUB2950:PING
2510 PLOT7,21,"Well done, now try this"
2515 PLOT7,22,"Well done, now try this":WAIT200
2520 GOSUB2950:GOTO 2700
2600 GOSUB2950:PLOT2,21,CHR$(0)+CHR$(10):PLOT2,22,CHR$
(0)+CHR$(10)
2610 WAIT100:ZAP:PLOT8,21,"Correct answer is "+S$
2620 PLOT8,22,"Correct answer is "+S$:WAIT500
2630 GOSUB2950
2700 IFF=1THEN 2800
2710 SC=SC+1:SC$=MID$(STR$(SC),2)
2720 PLOT32,1,SC$:PLOT32,2,SC$
2800 W=5:Z=6
2810 FORX=1TO10
2820 PLOTW,Z,"  "
2830 W=W+3:NEXTX
2840 W=5:Z=17
2850 FORX=1TO10
2860 PLOTW,Z,"  "
2870 W=W+3:NEXTX
2880 C=C+1
2890 UNTIL C=10
2900 IF SC=>8 THEN GOSUB 12000
2910 GOTO210
2950 PLOT5,21,"                                    "
2960 PLOT5,22,"                                    "
2970 RETURN
3000 CLS:PAPER0:INK4
3010 PLOT2,1,CHR$(1)+CHR$(10):PLOT2,2,CHR$(1)+CHR$(10)
3020 PLOT5,1,"Taking Away":PLOT5,2,"Taking Away"
3025 PLOT25,1,"Score: ":PLOT25,2,"Score: "
3030 C=0:S=0:SC=0:SC$=MID$(STR$(SC),2):S$=MID$(STR$(S)
,2)
3035 PLOT32,1,SC$:PLOT32,2,SC$
3040 REPEAT
3050 X=1:Y=5:F=0
3060 FORJ=1TO3
3070 PLOTX,Y,23:PLOTX+36,Y,16
3080 Y=Y+1:NEXTJ
3090 X=17:Y=10:PLOT10,11,10:PLOT10,12,10
3100 FORJ=1TO4
3110 PLOTX,Y,23:PLOTX+3,Y,16
3120 Y=Y+1:NEXTJ:PLOT18,11,"-":PLOT18,12,"-"
3130 X=1:Y=16
3140 FORJ=1TO3
3150 PLOTX,Y,23:PLOTX+36,Y,16
3160 Y=Y+1:NEXTJ
3170 K=INT(RND(1)*3)+4:L=INT(RND(1)*10)+1:M=INT(RND(1)
*L)+1
3180 W=5:Z=6
3190 FORI=1TOL:PLOTW,Z,X$(K)
3200 W=W+3:NEXTI
3210 W=5:Z=17
3220 FORJ=1TOM:PLOTW,Z,X$(K)
3230 W=W+3:NEXTJ
3240 PLOT2,21,CHR$(2)+CHR$(14):PLOT2,22,CHR$(2)+CHR$(1
4)
3250 PLOT15,21,"Answer =":PLOT15,22,"Answer ="
3270 S=L-M:GOSUB 160
3275 IF B=>0 AND B<=20 THEN 3300
3280 ZAP:PLOT9,24,CHR$(5)+"ERROR TRY AGAIN!":WAIT200
```

S PROGRAM

```
 3290 PLOT8,24,"                              ":GOTO3270
 3300 IFB=S THEN 3500
 3310 IFF=1THEN 3600
 3320 F=1
 3325 PLOT2,21,CHR$(4)+CHR$(14):PLOT2,22,CHR$(4)+CHR$(1
4):GOSUB3950:ZAP
 3330 PLOT8,21,"Sorry wrong, try again"
 3335 PLOT8,22,"Sorry wrong, try again":WAIT200
 3340 GOTO3270
 3500 PLOT2,21,CHR$(2)+CHR$(10):PLOT2,22,CHR$(2)+CHR$(1
0):GOSUB3950:PING
 3510 PLOT7,21,"Well done, now try this"
 3515 PLOT7,22,"Well done, now try this":WAIT200
 3520 GOSUB3950:GOTO 3700
 3600 GOSUB3950:PLOT2,21,CHR$(7)+CHR$(10):PLOT2,22,CHR$
(7)+CHR$(10)
 3610 WAIT100:ZAP:PLOT8,21,"Correct answer is "+S$
 3620 PLOT8,22,"Correct answer is "+S$:WAIT500
 3630 GOSUB3950
 3700 IFF=1THEN 3800
 3710 SC=SC+1:SC$=MID$(STR$(SC),2)
 3720 PLOT32,1,SC$:PLOT32,2,SC$
 3800 W=5:Z=6
 3810 FORX=1TO10
 3820 PLOTW,Z,"  "
 3830 W=W+3:NEXTX
 3840 W=5:Z=17
 3850 FORX=1TO10
 3860 PLOTW,Z,"  "
 3870 W=W+3:NEXTX
 3880 C=C+1
 3890 UNTIL C=10
 3900 IF SC=>8 THEN GOSUB 12000
 3910 GOTO210
 3950 PLOT5,21,"                                "
 3960 PLOT5,22,"                                "
 3970 RETURN
 4000 CLS:PAPER3:INK4
 4010 PLOT2,1,CHR$(0)+CHR$(10)
 4020 PLOT2,2,CHR$(0)+CHR$(10)
 4030 PLOT5,1,"Smallest":PLOT5,2,"Smallest"
 4040 PLOT25,1,"Score: ":PLOT25,2,"Score: "
 4050 C=0:SC=0:F=0:SC$=MID$(STR$(SC),2)
 4055 PLOT 32,1,SC$:PLOT32,2,SC$
 4060 REPEAT
 4070 X=48280
 4080 FORJ=1TO13:POKEX,18:X=X+40:NEXTJ
 4090 X=11:Y=8
 4100 FORJ=1TO4:PLOTX,Y,16:PLOTX+6,Y,18:PLOTX+10,Y,16:P
LOTX+16,Y,18
 4110 Y=Y+1:NEXTJ
 4120 X=1:Y=12
 4130 FORJ=1TO4:PLOTX,Y,16:PLOTX+6,Y,18:PLOTX+30,Y,16:P
LOTX+36,Y,18
 4140 Y=Y+1:NEXTJ
 4150 PLOT2,9,10:PLOT2,10,10
 4160 PLOT2,13,10:PLOT2,14,10
 4170 PLOT10,17,0
 4180 FORJ=1TO4:A=INT(RND(1)*50)+1
 4190 H(J)=A:NEXTJ
 4200 FORJ=1TO4
 4210 IF J=1 THEN X=13:Y=9
 4220 IF J=2 THEN X=23:Y=9
 4230 IF J=3 THEN X=3:Y=13
 4240 IF J=4 THEN X=33:Y=13
 4250 N$=MID$(STR$(H(J)),2)
 4255 IFLEN(N$)=1 THEN N$=" "+N$
 4260 PLOTX,Y,N$:PLOTX,Y+1,N$
 4270 NEXTJ
 4280 G=55
 4290 FORI=1TO4
 4300 IFH(I) <G THEN G=H(I)
 4310 NEXT I
 4320 PLOT2,21,CHR$(4)+CHR$(14)
 4330 PLOT2,22,CHR$(4)+CHR$(14)
 4335 GOSUB4900
 4340 PLOT14,21,"Smallest ="
 4350 PLOT14,22,"Smallest ="
 4355 S=G
 4360 GOSUB160
 4370 IFB=>1 AND B<=50 THEN 4400
 4380 ZAP:PLOT10,16,CHR$(0)+"ERROR TRY AGAIN !"
 4390 WAIT100:PLOT 9,16,"                              ":GOTO4320
 4400 IF B=S THEN 4600
 4410 IF F=1 THEN 4500
 4420 F=1:GOSUB4900:PLOT 2,21,CHR$(1)+CHR$(14):PLOT2,22
,CHR$(1)+CHR$(14):ZAP
 4430 PLOT8,21,"Sorry wrong, try again"
 4440 PLOT8,22,"Sorry wrong, try again"
 4450 GOTO4360
 4500 PLOT2,21,CHR$(1)+CHR$(10)
 4510 PLOT2,22,CHR$(1)+CHR$(10)
 4520 GOSUB4900
 4525 WAIT 100:ZAP
 4530 PLOT 9,21,"Correct answer is "+S$
 4540 PLOT 9,22,"Correct answer is "+S$
 4550 WAIT 400:GOTO4700
 4600 GOSUB4900:PING
 4610 PLOT2,21,CHR$(4)+CHR$(10)
 4620 PLOT2,22,CHR$(4)+CHR$(10)
 4630 PLOT10,21,"Well done, now try"
 4640 PLOT10,22,"Well done, now try":WAIT100
 4700 IF F=1 THEN 4800
 4710 SC=SC+1
 4720 SC$=MID$(STR$(SC),2)
 4730 PLOT32,1,SC$:PLOT 32,2,SC$
 4800 C=C+1:F=0
 4810 FORJ=1TO4
 4820 IFJ=1 THENX=13:Y=9
 4830 IFJ=2 THENX=23:Y=9
 4840 IFJ=3 THENX=3:Y=13
 4850 IFJ=4 THENX=33:Y=13
 4860 PLOTX,Y,"  ":PLOTX,Y+1,"  "
 4870 NEXTJ
 4880 UNTILC=10
 4885 IFSC=>8 THEN GOSUB12000
 4890 GOTO 210
 4900 PLOT5,21,"                                "
 4910 PLOT5,22,"                                "
 4920 RETURN
 5000 CLS:PAPER6:INK4
 5010 PLOT2,1,CHR$(0)+CHR$(10)
 5020 PLOT2,2,CHR$(0)+CHR$(10)
 5030 PLOT5,1,"Biggest":PLOT5,2,"Biggest"
 5040 PLOT25,1,"Score: ":PLOT25,2,"Score: "
 5050 C=0:SC=0:F=0:SC$=MID$(STR$(SC),2)
 5055 PLOT 32,1,SC$:PLOT32,2,SC$
 5060 REPEAT
 5070 X=48280
 5080 FORJ=1TO13:POKEX,17:X=X+40:NEXTJ
 5090 X=11:Y=8
 5100 FORJ=1TO4:PLOTX,Y,23:PLOTX+6,Y,17:PLOTX+10,Y,23:P
LOTX+16,Y,17
 5110 Y=Y+1:NEXTJ
 5120 X=1:Y=12
 5130 FORJ=1TO4:PLOTX,Y,23:PLOTX+6,Y,17:PLOTX+30,Y,23:P
LOTX+36,Y,17
 5140 Y=Y+1:NEXTJ
 5150 PLOT2,9,10:PLOT2,10,10
 5160 PLOT2,13,10:PLOT2,14,10
 5170 PLOT10,17,0
 5180 FORJ=1TO4:A=INT(RND(1)*50)+1
 5190 H(J)=A:NEXTJ
 5200 FORJ=1TO4
 5210 IF J=1 THEN X=13:Y=9
 5220 IF J=2 THEN X=23:Y=9
 5374 IF J=3 THEN X=3:Y=13
 5240 IF J=4 THEN X=33:Y=13
 5250 N$=MID$(STR$(H(J)),2)
 5255 IFLEN(N$)=1 THEN N$=" "+N$
 5260 PLOTX,Y,N$:PLOTX,Y+1,N$
 5270 NEXTJ
 5280 G=0
 5290 FORI=1TO4
 5300 IFH(I) >G THEN G=H(I)
 5310 NEXT I
 5320 PLOT2,21,CHR$(4)+CHR$(14)
 5330 PLOT2,22,CHR$(4)+CHR$(14)
 5335 GOSUB5900
 5340 PLOT14,21,"Biggest ="
 5350 PLOT14,22,"Biggest ="
 5355 S=G
 5360 GOSUB160
 5370 IFB=>1 AND B<=50 THEN 5400
 5380 ZAP:PLOT10,16,CHR$(0)+"ERROR TRY AGAIN !"
 5390 WAIT100:PLOT 9,16,"                              ":GOTO5320

 5400 IF B=S THEN 5600
 5410 IF F=1 THEN 5500
 5420 F=1:GOSUB5900:PLOT 2,21,CHR$(1)+CHR$(14):PLOT2,22
,CHR$(1)+CHR$(14):ZAP
 5430 PLOT8,21,"Sorry wrong, try again"
 5440 PLOT8,22,"Sorry wrong, try again"
 5450 GOTO5360
 5500 PLOT2,21,CHR$(1)+CHR$(10)
 5510 PLOT2,22,CHR$(1)+CHR$(10)
 5520 GOSUB5900
 5525 WAIT 100:ZAP
 5530 PLOT 9,21,"Correct answer is "+S$
 5540 PLOT 9,22,"Correct answer is "+S$
 5550 WAIT 400:GOTO5700
 5600 GOSUB5900:PING
 5610 PLOT2,21,CHR$(4)+CHR$(10)
 5620 PLOT2,22,CHR$(4)+CHR$(10)
 5630 PLOT10,21,"Well done, now try"
 5640 PLOT10,22,"Well done, now try":WAIT100
 5700 IF F=1 THEN 5800
 5710 SC=SC+1
 5720 SC$=MID$(STR$(SC),2)
 5730 PLOT32,1,SC$:PLOT 32,2,SC$
 5800 C=C+1:F=0
 5810 FORJ=1TO4
 5820 IFJ=1 THENX=13:Y=9
 5830 IFJ=2 THENX=23:Y=9
 5840 IFJ=3 THENX=3:Y=13
 5850 IFJ=4 THENX=33:Y=13
```

ORIC/ATMOS PROGRAM

```
 5860 PLOTX,Y,"  ":PLOTX,Y+1,"  "
 5870 NEXTJ
 5880 UNTILC=10
 5885 IFSC=>8 THEN GOSUB12000
 5890 GOTO 210
 5900 PLOT5,21,"                                "
 5910 PLOT5,22,"                                "
 5930 RETURN
 6000 FORJ=1TO22
 6010 READO(J),N(J),B(J)
 6020 NEXTJ
 6030 DATA3,8,11,3,8,11,3,8,11,3,12,11,4,3,44,4,3,44,4,
5,22,4,5,11,4,5,11,4,3,44
 6040 DATA4,3,44,4,1,22,4,1,11,4,1,11,3,12,22,3,12,22,3
,10,11,3,8,11,3,10,11
 6050 DATA3,12,11,3,8,44,3,8,44
 6100 FORJ=1TO30
 6110 READO1(J),N1(J),B1(J)
 6120 NEXTJ
 6130 DATA 4,8,10,4,8,10,4,8,10,4,8,30,4,12,10,5,3,30,4
,12,10,4,8,40,4,10,30
 6140 DATA 4,10,10,4,10,40,4,7,30,4,5,10,4,3,20
 6150 DATA 4,8,10,4,8,10,4,8,10,4,8,30,4,12,10,5,3,30,4
,12,10,4,8,10,4,8,10
 6160 DATA 4,8,10,4,10,30,4,10,10,4,3,30,4,7,10,4,8,40,
4,8,40
 6170 RETURN
 10000 TEXT:PAPER1:INK1
 10010 X=4:Y=4
 10020 FORI=1TO10
 10030 PLOTX,Y,19
 10040 PLOTX+30,Y,17
 10050 Y=Y+1:NEXT
 10055 PLOT8,7,10:PLOT8,8,10
 10060 PLOT10,7,"INFANTS    ORIC 1"
 10070 PLOT10,8,"INFANTS    ORIC 1"
 10075 PLOT7,12,CHR$(4)+"for younger children"
 10080 PLOT4,14,20:PLOT34,14,17'
 10085 X=4:Y=21
 10090 FORI=1TO3
 10100 PLOTX,Y,23:PLOTX+30,Y,17
 10110 Y=Y+1:NEXT
 10120 PLOT5,22,12
 10130 PLOT7,22,CHR$(96)+" J.WRIGHT SOFTWARE 1984"
 10140 GOSUB10500
 10200 WAIT400:RETURN
 10500 FORI=1TO22
 10510 MUSIC 1,O(I),N(I),10:PLAY1,0,0,0:WAITB(I)
 10520 PLAY0,0,0,0:NEXTI
 10530 RETURN
 11000 X=46808
```

```
 11010 FORJ=1TO40
 11020 READD:POKEX,D
 11030 X=X+1:NEXTJ
 11040 DATA 3,59,43,59,63,63,20,0,62,62,62,62,62,62,20,
0,56,30,35,15,35,30,56,0
 11050 DATA 3,53,31,15,7,31,48,0,32,18,60,56,48,56,6,0
 11060 X=46376
 11070 FORJ=1TO16
 11080 READD:POKEX,D
 11090 X=X+1:NEXTJ
 11095 DATA31,0,0,63,63,42,63,0,60,60,60,62,62,42,62,0
 11100 X=46584
 11110 FORJ=1TO16
 11120 READD:POKEX,D
 11130 X=X+1:NEXTJ
 11140 DATA16,44,32,31,31,63,32,0,0,40,56,52,60,32,48,0
 11150 X=47064
 11160 FORJ=1TO24
 11170 READD:POKEX,D
 11180 X=X+1:NEXTJ
 11190 DATA24,32,32,39,47,63,31,0,0,0,0,8,40,52,62,0,28
,34,56,60,56,34,28,0
 11200 X=46416
 11210 FORJ=1TO8:READD:POKEX,D
 11220 X=X+1:NEXTJ
 11230 DATA63,63,63,63,63,63,63,63
 11240 X=46560
 11250 FORJ=1TO8:READD:POKEX,D
 11260 X=X+1:NEXTJ
 11270 DATA 3,7,15,31,31,63,63,63
 11280 X=46576
 11290 FORJ=1TO8:READD:POKEX,D
 11300 X=X+1:NEXTJ
 11310 DATA 48,56,60,62,62,63,63,63
 11400 RETURN
 12000 CLS:PAPER0:INK7
 12010 X=48042
 12020 FORJ=1TO26:POKEX,14:X=X+40:NEXTJ
 12030 X=4:Y=3
 12040 FORB=1TO6
 12050 A=INT(RND(1)*7)+1
 12060 PLOTX,Y,CHR$(A)+"****     Well     Done     ****"
 12070 PLOTX,Y+1,CHR$(A)+"****     Well     Done     ****"
 12080 Y=Y+4:NEXTB
 12090 WAIT300
 12100 FORI=1TO30
 12110 MUSIC1,O1(I),N1(I),10:PLAY1,0,0,0
 12120 WAITB1(I):PLAYO,O,O,O
 12130 IF I=14 THEN WAIT20
 12140 NEXTI
 12150 RETURN
```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EXPORT ORDERS WELCOME

1984 hi-score

This week Commodore 64 games come under the microscope. Our experts have picked the best and worst from 1984

Originality
Impossible Mission from Epyx offers a mix of the athletic and the intellectual. Both aspects push you hard and are guaranteed to get you foaming at the mouth. The graphics are really slick and nearly got our vote for best graphics. Great sound too — the software generated speech is clear and the inflection just right. If it has a drawback, it's that the puzzle side is really tough. Up to now I've managed to put together just one computer card. If you enjoy arcade games and jigsaw puzzles you can't afford to miss this one.

Very Best
Not too original this one, but when it comes to delivery, Boulder Dash Front Runner has got it all. The idea's simple. Collect the jewels and avoid the multitude of methods of death. The graphics are really special. The screen gives a window onto the main playing area with smooth- scrolling in all directions. The 'physics' of the scenario are accurate and the execution is flawless. The strength of the game is that each screen requires specific tactics, but there is sufficient randomness in some screens to keep your interest going. It's addictive, frustrating and totally enjoyable.

Best Adventure
There are only one or two real adventure writers in this world. In the states, Infocom is the governor. In the UK it's got to be Level 9. Whilst other firms make a lot of noise about their clever gimmicks such as smart parsers and artificial intelligence, Level 9 gives it with the minimum of fuss. What really scores about Return to Eden is that the usual excellent text is supplimented by some rather nice graphics. The pictures may not be as good as some other games but they're drawn quickly and are colourful. The challenge of the game is huge with over 200 locations and diabolical teasers and puzzles.

Space game
When it comes down to it, there aren't many ways of implementing a space game. After the two dimensional Space Invaders and Galaxians, 3D effects are now in vogue. Zaxxon by US Gold gives unbeatable 3D effect and is a classic amongst computer games. The shadow of your space ship on the floor and the overall graphics design is completely convincing. If there is a fault, and it's not unique to Zaxxon, it's that subsequent levels just become tougher with perhaps too little variety. Quibbles aside, this one has got to have a place in any 64 owner's games collection.

Ladder and level
Ladder and level games present quite a challenge to programmers since it's difficult to come up with really novel ideas. The author of Frantic Freddie by Audiogenic didn't bother, he simply concentrated on writing a slick game with excellent graphics, sound and great challenge. The idea is simple; collect the gold and bonuses and avoid the nasties. Each screen has different sound and nasties. The design of the nasties is excellent with just the right amount of humour. As for the sound — there ain't many about which are better.

Best graphics
The 1984 Olympics had a significant effect on the computer games market in that there was a flood of games involving the participation in athletics events. Summer games by Quicksilva was no exception to this and as such had a content which was only just above average. Where this game scored was in the superb use of graphics and animation. All events had a multicolour backdrop which was remarkably realistic. This, however, was surpassed by the brilliant animation of the figures and other moving objects. The flight of doves in the opening ceremony was really quite exceptional.

Sound
If Summer Games was an average game with superb graphics, Activision's Ghostbusters is an average game with superb music. The game itself turns out to be rather monotonous with you simply travelling about capturing ghosts etc. This is to some extent eased by the tolerably good graphics. When it comes down to it, however, it's the Ghostbusters theme which really grabbed me. It's as close as you're likely to get to the original with full three parts and drums. This is enhanced by the splendid soft speech (nearly the best I've heard). If ever I'm in the mood for a bit of a groove, I don't bother with Radio 1, I just load Ghostbusters.

Utility
For all it's faults, and it has a few, the 64 has some rather excellent graphics. Unfortunately Commodore elected not to support these capabilities. Then along came Koala with a rather nifty drawing pad and a handy little lump of software. With this gear you can create some rather tasty pictures. Whilst the touch pad works well enough, the software saves the day. Slick, versatile and idiot proof — there's even a command to erase your last faux pas. The package is a bit on the pricey side but it's great fun... even your kids will enjoy it.

Humorous
Everyone likes a cartoon. The sight of the evil baddy being splatted by a big rock or being scorched by an exploding stick of dynamite is guaranteed to raise a snigger. The author of New Generation's Cliff Hanger realised this and wrote a game about it. The graphics are the strong point with bold colourful designs and shapes. The animated effects are particularly jolly and it's nice to know that nobody gets hurt. The creator of this gem must have sat up many nights thinking up the various scenarios.

Most hyped and failed
Alice in Video by Audiogenic doesn't quite fit this category but I couldn't think of a better candidate. I remember, many moons ago, seeing an excerpt from this game at the Commodore show. At the time there was nothing like it and we all waited with baited breath for it's appearance. After an interminable wait it appeared. Super graphics, brilliant music and an appallingly weak game. Such a shame... it could have been a winner.

A.W. and M.W.

Close-up on machine code monitors for the BBC/ Electron

Shingo Sugiura studies six of the best and comes up with his assessment. Read on to find out how they compare

On the Beeb, you are positively encouraged to write programs in machine code simply because of the very user-friendly and powerful assembler which can easily be linked with BASIC.

However powerful the assembler may be, debugging machine code is never easy. If you've made a mistake, you are most likely to be faced by an inexplicable crash. This is not the assembler's fault and the only way to debug machine code programs is to use machine code monitors.

There is a daunting number of machine code monitors for the BBC micro available and since they're not often reviewed, it's difficult to make a choice. So in this article, I have looked at six of the best selling ROM-based machine code monitors available for the BBC (and the Electron in the case of Starmon).

In comparing the various monitors, I have concentrated on the following points:

Screen layout: The screen layout of a machine code monitor should be clear with as much of the necessary information as possible on the screen at once. The use of colour is often helpful but excessive use could well be distracting.

Expression evaluator: A good expression evaluator is very useful. You may think that as long as hexadecimal is understood, it's OK but it's often useful to use decimal or whole expressions such as 3*5+&10.

Disassembler: The disassembler is the most frequently used facility of any machine code monitor. It is vital that the disassambler is fast so that you can whizz through to a desired memory location. Extra facilities such as labelled subroutines and vectors, offsets and the ability to follow subroutines are useful (although quite surprisingly, none of these facilities were implemented by the monitors reviewed).

Memory dump/editor: Programming in assembly language doesn't mean you don't have to look at hex dumps. Memory dumps are often useful to examine data tables for example. The ability to edit memory in a simple manner is very important. For example, you don't want to go back to BASIC just to alter one byte of memory using the indirection operator. Full screen memory editors which allow you to scroll through memory and edit any byte in hex (possibly a nibble at a time) or ASCII is a real boon. It's also very useful to be able to edit in assembler mnemonics for obvious reasons.

Search: It is often necessary to find a string of bytes or characters. The search should be as fast as possible and it should be able to search for more than one byte at a time.

Single step/emulation: The ability to go through machine code one instruction at a time is called single stepping. This is an extremely useful feature for debugging machine code.

Breakpoints: Although single stepping is very useful, it is a real pain going through a monitor or a section of code which you know to be working correctly. Sometimes, all you need to know is the contents of the registers at a certain point in the program. This can be done by setting break points.

Subroutine calls: A machine code routine may seem to be working, but in reality, it isn't. Now you can single step through the routine using the above feature, but in some cases it's enough to examine the contents of the registers or certain memory locations. In this type of situation, this feature is quick and often effective.

Memory shift/Relocation: The ability to shift a block of memory to another address is almost always included in machine code monitors even though they are seldom used. The same goes for code relocators. This feature is rather hazardous since 100% code relocation is almost always impossible.

Compare memory blocks: Another feature which is hardly used, but almost always implemented is the facility to compare two blocks of memory.

Assembler: You may be wondering why I'm mentioning an assembler in a machine code monitor article, when there's a very good one built in BASIC. One reason is for altering small parts of a machine code program without actually having to return to BASIC. Another reason is that there are several problems with using the BASIC assembler. For example, the assembler directives aren't very powerful and for writing very large machine code programs, it is rather cumbersome. However, to overcome this problem, you need a full two pass assembler and usually, assemblers included in monitors are simple pass types which can be used for the former reason.

Manual: Last but not least, the manual. A good manual is essential because let's face it, machine code monitors are quite complicated beasts. A manual should be clear but comprehensive. It is also helpful to have technical information about the machine code monitor itself, for example, the amount of memory it uses. Excessive use of technical jargon doesn't make reading easy.

The machine code monitors I looked at are: **Exmon-I** and **Exmon-II** by Beebugsoft, **Gremlin** by Computer Concepts, **Beebmon** by Watford Electronics, **Starmon** by Slogger Software and **ADE** by Systems. The addresses of the suppliers are given at the end of this article.

Screen layout

When **Exmon-I** is entered, MODE7 is selected and part of zero page is shown together with the registers. As the commands are entered and executed, the screen scrolls. Every time the RETURN key or BREAK is pressed, the memory dump (front panel) is updated. **Exmon-II** has a similar screen

```
                EXMON by BEEBUG
A  X  Y  S  P  flags    PC     stack
00 00 00 FF 30    B     0000

0000 : 24 19 24 19 00 7C 00 7C $.$..ǁ.ǁ
0008 : 00 30 01 0B 00 00 FF 65 .0.....e
0010 : FF 7F 00 02 05 00 00 00 ........
0018 : 19 00 07 00 00 19 00 00 ........
0020 : 00 24 02 FF C3 07 00 40 .$.....@
0028 : FF 00 07 00 00 00 00 00 ........
0030 : 03 00 00 00 00 C3 07 00 ........
0038 : 07 EE 20 00 FF 01 19 08 ..  ....
0040 : 03 00 00 00 86 81 06 00 ........
0048 : 00 00 00 00 00 00 00 19 ........
0050 : 10 00 10 00 10 00 FF FF ........
0058 : FF FF FF FF FF FF FF FF ........
0060 : 00 06 FC 15 06 00 00 00 ........
0068 : 00 00 1C 00 00 00 00 C4 ........
0070 : 41 3C 66 66 7E 66 66 66 A<ff~fff
0078 : 00 00 C0 03 00 00 00 00 ........
Type ? for command list
```

Exmon — screen dump

layout although the commands are confined to the bottom few lines of the screen. Also, colour is used to good effect (in Exmon-I, the only splash of colour is found in the title!).

When **Gremlin** is entered, a hex dump is shown in a similar fashion to Exmon, but the commands are entered and executed in the lower half of the screen. This means that the hex dump is left untouched. A unique feature of Gremlin is that it can work in any mode although screen update is understandably slow in modes other than MODE7.

When **Beebmon** is entered, MODE7 is selected and a little command strip appears at the top of the screen. The commands are always entered in the same place but any output is directed to the rest of the screen. This is probably the most user friendly and neat screen layout and should suit beginners to machine code.

When **Starmon** is entered MODE6 is selected (don't forget, this monitor was originally written specifically for the Electron which does not have MODE7) and 17 bytes are displayed together with the registers and breakpoints. Commands are entered in a command strip at the bottom of the screen. One nice feature is that you can repeat or even edit the last command you typed in. For some reason, Slogger decided to use a rather garish yellow.

On entering **ADE**, MODE7 is selected, and a section of memory in page &FE is printed together with the registers at the top. A couple of lines at the bottom of the screen is used as a command entry window. One nice feature of ADE is its extremely fast screen update and colour is used to good effect.

Expression evaluator

Exmon-I and **Exmon-II** use the BBC BASIC's very powerful expression evaluator. Obviously, this means that anything that BASIC understands, Exmon understands (although Exmon-I doesn't support variables). However, expressions can't be included in commands in the form "DIS &1900+32*2". You can only calculate.

Gremlin features the most powerful expression evaluator of the lot. It is based on the language C so programmers reared on BASIC will find it rather confusing at first. Expressions may also be incorporated into commands in a form "CALL &100+32*3".

Beebmon, Starmon and **ADE** simply accept hexadecimal input.

Disassembler

Disassamblers of **Exmon**, **Starmon** and **ADE** are all pretty standard. One thing to note is the speed of ADE's disassembler. It's incredibly fast. the disassemblers of the two Exmons may be used to disassemble to file so the object code may be reassembled at a different address by the built-in assemblers.

Gremlin's disassembler can be used to disassemble in a format which can be read back and assembled at a different address by its built in assembler (see assembler).

Beebmon's disassembler is slightly more sophisticated than the others in that it allows you to scroll forwards and backwards through memory and it also allows you to type over the disassembled code using standard mnemonics to alter it. In this way, it's very easy to alter small parts of machine code.

Disassemblers in general were rather disappointing. It would have been nice if the operating system subroutines and the vectors were all labelled.

Memory dump/editor

Exmon-I has a useful memory dump facility but only supports a very crude hex/ASCII editor. **Exmon-II** supports a full bi-directional memory editor (hex/ASCII). However, the scrolling is painfully slow and the cursor tended to disappear when it was being moved at any decent speed.

Gremlin's memory dump is good, especially in 80 column modes where 16 bytes are

```
   05 1E  EXMON II by Beebugsoft  00
A  X  Y  S  P  flags    PC     stack
00 00 00 FF 30    B     8000

8000 C9 01     I.     CMP  #&01
8002 F0 1F     p.     BEQ  &8023
8004 60        £      RTS
8005 EA        j      NOP
8006 60        £      RTS
8007 0E 01 42  .B     ASL  &4201
800A 41 53     AS     EOR  (&53,X)
800C 49 43     IC     EOR  #&43
800E 00               BRK
800F 28               PLP
8010 43               ???
8011 29 31            AND  #&31
8013 39 38 32  982    AND  &3238,Y
8016 20 41 63   Ac    JSR  &6341

?D
?M 7C00→8000,1900
```

Exmon-II — screen dump

```
   A=65      X=10      Y=00
S  =01FF  89 10 E3 B8 93 93 DC 89  ........
PC=A400   20 BA 83 20 33 84 D0 06   ..  3...
          JSR 83BA
    7FF0  20 20 20 20 20 20 20 20
    7FF8  20 20 20 20 20 20 20 20
M  =8000  4C 96 80 4C 30 80 C2 16  L..L0...
    8008  10 57 4F 52 44 57 49 53  .WORDWIS
    8010  45 00 31 2E 31 37 00 28  E.1.17.(
    8018  43 29 31 39 38 32 20 43  C)1982 C
--------------------------------------------
GREMLIN

!M8000
!$ROM=1
!$A=65
!$X=10
```

Gremlin — screen dump

shown on one line. Although it doesn't have a full screen memory editor, it has a very powerful editing command 'P'. This allows you to alter the byte shown by the memory dump either by inputing a hex value (or 16-bit values) or a string of characters or even assembler mnemonics.

Beebmon is the only machine code monitor reviewed here which supports a full screen scrolling memory editor. In my opinion, this is the easiest editor to use.

Starmon does support a full screen editor but it only allows you to edit one screen full of memory at a time. Memory may be edited on hex or ASCII.

With ADE, you simply type a hex byte and it is written to the address pointed to by the memory pointer. The memory pointer is automatically incremented. In practice this system works well and can be quick and effective once you get used to it.

Search

All of the monitors allow you to search for a number of hex bytes or a number of ASCII characters. The search is quick.

Single step

In single stepping mode on **Exmon-I** there are three options. By pressing the space bar, the current instruction is executed and the contents of the registers are updated. By pressing '/' you can single step through programs as above except when a JSR instruction is encountered, when the subroutine is treated as one step.

By pressing 'Z' you can simulate a series of instructions in succession, constantly displaying the instructions and the registers. Equivalent to pressing the space bar n times. On **Exmon-II**, all these facilities are available on top of a unique feature called dual screen. Quite literally, this facility allows you to flip back and forth between your graphics screen and Exmon's status screen at will. I must confess that this is the best debugging aid for graphics programs I have ever come across.

In **Gremlin**, you can single step through code by pressing 'S'. You can set limits to the memory area to be single stepped, so that if you set the upper limit to &8000, JSRs to the operating system will be treated as a single step. This is similar to the Beebug's '/' option but not as useful.

In **Beebmon**, you can set limits as you can in Gremlin, but there is also a command to single step n times as in Exmon.

In **Starmon**, you can single step throgh code by pressing CIRC-Z. There is no option to treat subroutines as one step or an option to single step specified number of times. You can, however, treat all operating system calls as single step (subroutines in &C000-&FFFF).

Single stepping on **ADE** is the weakest of the lot. For a start, it doesn't allow you to set limits, treat subroutines as a single step nor does it allow you to single step a specified number of times. But, worst of all, it gets confused if you alter the code you're stepping through calls any operating system subroutines (although this problem can be overcome by using breakpoints).

One impressive feature is the screen output. The disassembled code is constantly updated as in the others, but in ADE the current instruction is lit up and update on ADE is incredibly fast.

Breakpoints

Perhaps because of **Exmon-I's** age (it was one of the earliest machine code monitors on the market), it features one of the weakest breakpoint handlers. It allows you to set up to five breakpoints. When Exmon-I 'hits' a breakpoint, the contents of the registers will be displayed and control will return to the monitor.

On **Exmon-II**, up to 10 breakpoints are allowed at once and they may have conditions attached to them. For example, you may set a breakpoint so that it is only effective if the accumulator contains 100. Quite surprisingly, this exceedingly useful facility is only found on Beebmon and Starmon.

In **Gremlin**, you can have up to eight breakpoints. As in Exmon-I, you can't set them in ROM and they can't have any conditions, as in Exmon-II, Beebmon and Starmon. When a breakpoint is encountered, a warning beep will sound and the registers are updated. The user may then continue execution to the next breakpoint or return control to the monitor.

Beebmon's breakpoint handling facility is very powerful but also fairly complicated to use. Breakpoints can be set anywhere, even in ROM, but more importantly, you can set conditions to the breakpoints. For example, you can set a breakpoint at &1900 but cause a break only when the

```
Watford          REFRMON          Electronics
                Modification mode
Command : MM
Start : 7C00 End : 8000 To : 1900

 Loc   0  1  2  3  4  5  6  7  01234567
8000  C9 01 F0 1F 60 EA 60 0E  ....£.£.
8008  01 42 41 53 49 43 00 28  .BASIC.(
8010  43 29 31 39 38 32 20 41  C)1982 A
8018  63 6F 72 6E 0A 0D 00 00  corn....
8020  80 00 00 A9 84 20 F4 FF  ..... ..
8028  86 06 84 07 A9 83 20 F4  ......  .
8030  FF 84 18 A2 00 86 1F 8E  ........
8038  02 04 8E 03 04 CA 86 23  .......#
8040  A2 0A 8E 00 04 CA 8E 01  ........
8048  04 A9 01 25 11 05 0D 05  ...%....
8050  0E 05 0F 05 10 D0 0C A9  ........
8058  41 85 0D A9 52 85 0E A9  A...R...
8060  57 85 0F A9 02 8D 02 02  W.......
8068  A9 B4 8D 03 02 58 4C DD  .....XL.
8070  8A 41 4E 44 80 00 41 42  .AND..AB
8078  53 94 00 41 43 53 95 00  S..ACS..
```

Beebmon — screen dump

```
          STARMON  MONITOR  vB1.2
       (C) Slogger Software 1984

BRK OFF    EVENTS                -8 08   .
0000 R                           -7 02   .
                                 -6 00   .
                                 -5 0D   .
                                 -4 CD   M
TRACES          ROM = 08         -3 D9   Y
                                 -2 1C   .
                                 -1 DC   \
                                0000 02  .
                                +1 1A    .
                                +2 02    .
PC = 0000       RA = 00          +3 1A    .
SP = 01FF -     RX = 00          +4 00    .
SR = 00000000   RY = 00          +5 60    `
     -V.BDIZC                    +6 00    .
                                 +7 60    `
                                 +8 00    .
```

Starmon — screen dump

accumulator contains &19, say. The problem is, setting these conditions involves working at bit level, which isn't easy, to say the least. You can have eight breakpoints at once.

Starmon's monitor allows you to do the same as Beebmon's and Exmon's. Setting conditions is very simple unlike Beebmon. For example, to allow breakpoint to occur only when location 70 contains 20, you simply type E 70=20 XreturnX. However, one snag is that you can only set one breakpoint at a time.

With **ADE**, you have to manually insert a BRK instruction in the code by using the memory editor. This does mean that you can have as many breakpoints as you like, but it does also mean that you have to remember the original instruction if you want to restore your code after testing it. When a breakpoint is hit, the registers are displayed or you can choose to ignore BRK's altogether.

Subroutine calls

In **Exmon-I** and **Exmon-II**, pressing J allows you to perform a JSR to a given address. The registers are updated and displayed on return. All the registers (A,Y,X,P,S,PC) may be set manually with ease. One nice facility is the execution of OSBYTE and OSWORD. This allows you to set the register contents on entry and examine them on exit. Exmon-II allows you to simulate code with a trace facility. This option allows you to simulate instructions continuously, displaying them as it does so, until a breakpoint is encountered. Limits may be set to the traces and they may be suppressed altogether.

In **Gremlin**, JSR may be achieved by typing CALL address. The setting of registers on Gremlin is very simple since expressions may be included so you could, for example, type A=65*2+1.

In **Beebmon**, no code is executed directly. Instead, code is emulated. It is possible to emulate Beebmon itself or even languages such as BASIC. It's quite strange to be able to type in commands in a BASIC environment when it is actually being interpreted by Beebmon! To some, this may seem a bit of an overkill, but once you get used to this facility, it is very powerful indeed.

Starmon allows you to execute code by typing G. The registers may be set easily and as in Exmon, there is a facility to execute OSBYTE and OSWORD.

Spy allows you to execute code by typing J. The register contents are displayed on exit.

Memory shift/relocation

All the machine code monitors have a memory move command. All of them cope with overlapping data.

With **Gremlin** and **ADE**, relocating code is done by disassembling the code and reassembling it at the new address using the built in assemblers.

Both the **Exmons** can also do this but also have relocate commands.

Beebmon has a relocate command.

Starmon does not have a relocate command.

Memory compare

Apart from Gremlin, all the monitors have a facility to compare two blocks of memory.

Assembler

Exmon-I has a rather crude but perfectly usable assembler. It is a single pass type so you can't jump forward to a label. However, it is very useful for changing a small piece of code. Although the assembler on **Exmon-II** is similar, it is a vast improvement. The memory content is updated every time an instruction is assembled and although it is not a full two-pass type, it is possible to use forward labels.

One of **Gremlin's** strongest features is its full two pass assembler. Coupled with its very powerful expression evaluator, it rivals even the built-in BASIC assembler. In fact, since the assembler can assemble source code direct from disc (the source code is created using a text editor. Not surprisingly, the manual suggests the use of Wordwise for this purpose), there is no restriction on the size of the source code as in BASIC's assembler.

Beebmon supports a simple assembler but it can't handle labels or forward referencing, but it is useful for debugging small routines. The mnemonics are typed over the disassembled code which can be scrolled forward **or** backwards through memory.

Starmon does not support any sort of assembler.

ADE should in fact be considered more as an assembly language package rather than a machine code monitor. The machine code monitor is included to supplement the very powerful assembler. It is a full two pass assembler which supports various pseudo operators and macro. In fact, ADE even has a built in text editor to create your source code. This editor is so powerful that it can be used as a full wordprocessor as well! Needless to say, the assembler is the most powerful of all the assemblers reviewed here and more professional than the built in assembler!

```
→PC  001D   07 00 00 1A 00 00 00 24
  SP 01F4   61 B9 90 B5 07 01 04 F1
  X  04              ↑
  Y  04
  A  00
  P  73        V B   ZC

→803D   C9 F0        CMP   #&F0
 803F   F0 1C        BEQ   &805D
 8041   6C 8D 00     JMP   (&008D)
 8044   A2 79        LDX   #&79
 8046   FC C9 15     BEQ   &805D
 8048   C9 30        CMP   #&30
 804A   B0 11        BCS   &805D
 804C   4A           LSR
:
:
:
:J>2000
```

ADE — screen dump

Manual

Exmon-I comes with a 26-page A6 size manual. Because of its small size, some of the commands aren't as comprehensively described as they should be, but nevertheless, the explanations are clear and jargon has been kept to the minimum. Even though it is so small, it would have been nice if Beebug included an index and more technical information. The manual of **Exmon-II** is similarly laid out, but more comprehensive.

Gremlin comes with a 32-page A5 size manual. It's incredibly comprehensive and as a result, some parts are quite hard going. It would have helped if Computer Concepts spaced out the text a little more and included an index.

Beebmon comes with a 19-page A5 sized manual. The print is appreciably larger than the rest and also nicely spaced out. Although the explanations are short, they are easy to understand. Again, there is no index.

Since **ADE** is a very sophisticated package, as expected, its manual is large. It is of A4 size and consists of around 200 pages. There is a comprehensive index and the whole manual is very nicely presented. Each command is comprehensively described and there's plenty of technical information as well. In fact, I would even go as far as to say that there is nothing wrong with this manual.

Conclusion

Exmon-I is the oldest of the monitors reviewed in this article. As a result some of its facilities are crudely implemented, notably its memory editor and breakpoint facility. However, **Exmon-II** retains the user friendliness of the original and manages to squeeze in a few necessities. It's one of the best monitors on the market and is in fact my favourite. The dual screen facility is unbeatable and the debugging/simulation facilities are very powerful too. Also, it is very reasonably priced, especially to Beebug members. It should be at the top of your list of monitors.

Gremlin is one of the most powerful monitors available, but also one of the most complicated to use. Beginners to machine code may find that it is too difficult to use and the manual may also seem a little daunting. However, to experienced machine coders, it could be the one to choose.

Beebman is probably the most user friendly monitor of all. It is the only monitor with a decent full screen memory editor and scrolling disassembler and its emulation facility is unmatched by any other monitor.

Starman is very user friendly and has a very nice breakpoint facility. It must be remembered that it was originally designed for the Electron (with ROMbox) and as such, it uses MODE6 rather than the more usual MODE7. This does inevitably mean that the screen update is notably slower than any of the monitors reviewed here but overall, because of its user friendliness, it can be recommended to inexperienced machine code programmers. Of course, for Electron owners, this is the only machine code monitor designed to run with their machine in mind and can be highly recommended.

ADE is rather different from all the others in that it is a machine code development tool rather than just a machine code monitor. Its built in assembler is unparallelled and its monitor is perfectly usable. With its fantastic manual, I would say it's the obvious choice for any serious assembly language programmer. However, the machine code monitor is rather weak when compared with others available and should possibly be complemented by another monitor.

Exmon-I, Exmon-II, Bebugsoft PO Box 50, St Albans, Herts

Gremlin, Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX

Beebmon, Watford Electronics Dept BBC, Cardiff Rd, Watford, Herts

Starmon, Slogger Software, 215 Beacon Rd, Chatham, Kent

ADE, System, Dept B, 12 Collegiate Cres, Sheffield S10 2BA

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Hunchback II
CBM 64
£7.95

Ocean, 6 Central St, Manchester

After it's success with Hunchback, it's hardly surprising that Ocean has brought out a sequel. It seems Quasimodo doesn't keep Esmerelda from part 1 and must attempt to rescue her again.

This time he must scale a five-stage bell tower, each screen comprising one stage.

In effect, this is a graphical adventure. On each screen you collect the small bells. Whilst moving about you must avoid bats, fireballs, bouncing cannon-balls and other perils. You get about by climbing ropes and jumping about on platforms.

Graphically this game is very nicely done. I was particularly impressed with the way Quasimodo spins around the rotating gears when he falls in them. The other obvious feature is that it's tough. So far, I haven't got past screen two! The design of the graphics is to a high standard and the animation is smooth and well thought out.

Just when I thought I'd had enough of graphical adventures, something like this comes along and restores my interest. In many ways, I consider this to be better than part one. It's certainly more original. **A.W.**

instructions	60%
ease of use	80%
graphics	85%
value for money	90%

★★★★

Battle Through Time
CBM 64
£7.95

Anirog, Unit 10, Victoria Ind Est, Victoria Rd, Dartford, Kent

This is a classic shoot-'em-up game, the kind that has you reaching straight for the auto-fire switch on your joystick, if it has one. You have control of an all-terrain plasma tracked vehicle — in other words, a small car which can jump over obstacles. You can shoot forwards and upwards to destroy an assortment of planes, satellites, mutants, dinosaurs and what-have-you.

There are seven zones, each represents a different war, and you have to cover ten miles of each before being transported to the next.

Though the concept is simple, the game is quite difficult to play. It's easy to fall into a shell-hole while trying to evade the bombs being dropped on you. If you speed up to avoid a falling plane you may fail to shoot away a boulder before you crash into it.

Fortunately, you can start each game from the point where the last one ended, so you stand a fighting chance of seeing all the zones.

The graphics and sound are well up to standard, and it should keep you zapping happily for several hours. **M.N.**

instructions	80%
playability	85%
graphics	80%
value for money	80%

★★★★

Now follow that!

All these titles have a familiar sound. Find out if our reviewers think they come up to scratch

Blue Max
CBM 64
£9.95

US Gold, Unit 10, The Parkway Industrial Centre, Heneage St, Birmingham B7 4LY

You are at the controls of a World War 1 plane, flying over enemy territory, and your task is to shoot, strafe a bomb enemy targets. You have only a limited supply of fuel and bombs, but fortunately there are friendly runways at straegic intervals, where you can land for refuelling and repairs. Sounds easy, doesn't it?

It isn't the most difficult flight game I've seen, but it does have far better graphics than any of the others. You have a view of your plane and it's shadow, and the landscape which scrolls diagonally is very realistic.

You start the game with only one life, so until you have got the hang of it, the game can be over almost before it's started, but fortunately it shouldn't take you too long to learn how to take off and drop bombs safely. Strafing is more difficult, as it can only be done within a narrow altitude range.

It's an attractive and interesting game, but not one that I found hard to stop playing. **M.N.**

instructions	80%
playability	60%
graphics	95%
value for money	70%

★★★

Mr Wiz
CBM 64
£7.95

Superior Software, Regent Hse, Skinner Lane, Leeds

You must guide Mr Wiz about a garden collecting or eating cherries as you go. Small blue nasties called gremlins try to corner him. Scattered about the garden are apples, which can be undermined so that they fall on the gremlins. You gain extra points by eating the mushroom where the gremlins live, but this angers them and makes them nastier. Clear the screen and it's on to the next. By now you will have realised that this is a cover version of a well known arcade game, and as such it's a fair copy.

Design is slick with colourful graphics and smooth animation. The background music is a rather thin version of the overture from Orpheus in the underworld, and becomes rather tedious.

The pace is perhaps a little too fast, with rather mean nasties. I feel the less able players might find it too daunting. I found it boring after a while, but I'm sure real arcade fans will love it. The main weakness is it's lack of originality and variety. **A.W.**

instructions	65%
playability	75%
graphics	75%
value for money	60%

★★★

Kong Strikes Back
CBM 64
£7.95

Ocean, 6 Central St, Manchester

I'm rather suspicious at the best of times and it was with real scepticism that I loaded this game. If insufficient care is taken, trying to follow up a well-known arcade game can be a recipe for disaster. As it turned out, my fears were unfounded. This game is vastly superior to Kong Mark One.

The action takes place on a roller coaster. The heroine is held by Kong at the top of the track and you must climb up and rescue her. The main hazards are four cars which Kong sends down the track at you. You can either climb up ladders to avoid them or bomb them. If you bomb a car, Kong will send another down.

Since you only have four bombs, they shouls only be used in emergencies. There are other obstacles such as bouncing balls, waltzers and hobby horses, which will, at a single touch, deduct a life. You can collect bonuses by climbing up the various ladders on each of the four screens.

Since the movement of all obstacles is cyclic, this is a game of timing and tactics. The use of graphics is colourful and neat and the rag background music is most enjoyable.

Overall a tough and highly entertaining game. **A.W.**

instructions	60%
ease of use	85%
graphics	80%
value for money	85%

★★★★

An apple a day...

But it's not just one — it's 10 apples, and you must eat them all in a minute. Stuart Carson has you racing against time. Is your digestion up to it?

You must eat 10 apples in one minute. You can only eat half of an apple at a time, and each half gives you one point.

You can go through either side to come out on the opposite side, but be careful not to touch the hidden walls.

The keys to use are: **F1** up; **F2** left; **F3** right; **F4** down.

Here's a routine if you want to use a joystick. Just add these lines:

```
511 J = PEEK (56321)
512 IF J=253 THEN P2+P1
    =LL
513 IF J=254 THEN P2=P1
    -LL
514 IF J=251 THEN P2=P1
    -1: GOSUB 6000
515 IF J=247 THEN P2=P1
    +1: GOSUB 6010
```

Variables

A line number
B colour for walls
C random walls
P stars
S sound
CO score
LL move up or down
P1 position of apple eater

How it works

0-14 define characters
19-50 random blocks
299-450 random apples and time
500-640 movement and start of clock
1000-1002 sound for apples
3018-4980 score and ask for another go
4986-5002 sound for hitting walls
8000-9000 instructions

```
0 PRINTCHR$(142);:PRINT"
1 PRINT"
2 PRINT"                                                BY S.CARSON."
3 PRINT"      PLEASE WAIT   10 SECS FOR INSTRUCTIONS "
4 POKE52,48:POKE56,48:CLR :POKE53280,0:POKE53281,0
5 POKE56334,PEEK(56334)AND254:POKE1,PEEK(1)AND251:FORI=0TO511
6 POKEI+12288,PEEK(I+53248):NEXT:POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
7 FORI=12288TO12351:READA:POKEI,A:NEXT
8 DATA223,223,223,0,251,251,251,0
9 DATA3,25,61,59,63,31,7,3,64,152,188,220,252,248,224,192
10 DATA63,110,252,240,240,252,126,63
11 DATA56,108,254,255,248,254,124,56
12 DATA252,118,63,15,15,63,126,252
13 DATA28,54,127,255,15,255,62,28
14 DATA126,255,219,255,189,193,255,126
16 GOSUB8000
17 PRINTCHR$(142): POKE53272,(PEEK(53272)AND240)+12:POKE53280,11:POKE53281,11
18 POKE53270,16:GOSUB49
19 REM*******RANDOM BLOCKS**************
25 A=1145:B=54272:FORI=0TO110 :C=INT(RND(0)*810)+1:POKEA+C,0:POKEA+B+C,12
34 POKEA+1+C,0:POKEA+1+B+C,12:POKEA+2+C,0:POKEA+2+B+C,12:NEXTI:GOTO299
35 NEXT:POKES,0
49 REM
50 FORZ=0TO39:POKE1064+Z,0:POKE55336+Z,12:POKE1984+Z,0:POKE56256+Z,12:NEXT
60 RETURN
298 REM***********APPLES***************
299 A=1105:FORI=0TO12
300 C=INT(RND(1)*810)+1:POKEA+C,1:POKEA+B+C,5:POKEA+1+C,2:POKEA+1+B+C,5:NEXT
450 TI$="000000"
499 REM*******MOVEMENT  AND SCORE******
500 P1=1107:P2=P1:LL=40:C=54272:CH$=CHR$(19):POKEP1,7:POKEP1+C,3:CO=0
510 GETA$
600 IFA$=CHR$(13)THEN3039
```

```
605 IFA$="■"THENP2=P1-LL
606 IFA$="■"THENP2=P1-1:GOSUB6000
607 IFA$="■"THENP2=P1+1:GOSUB6010
608 IFA$="■"THENP2=P1+LL
610 IFPEEK(P2)<>32ANDPEEK(P2)<>1ANDPEEK(P2)<>2ANDPEEK(P2)<>0 THENGOTO630
615 IFPEEK(P2)=0THEN4980
620 IFPEEK(P2)=1OR PEEK(P2)=2 THENGOSUB1000:CO=CO+1:IFCO=20THEN3039
621 POKEP1,0:POKEP1+C,12
625 P1=P2:POKEP1,3:POKEP1+C,3
626 :POKEP1,7:POKEP1+C,3:FORI=1TO20:NEXT
630 PRINTCHR$(19);:PRINTTAB(4);"■POINTS=■";CO
631 PRINT"■■■
```

Mighty mouse

Dave Carlos has been looking at AMX Mouse — and he's impressed with what he sees. Read on to find out why

AMX Mouse
32K BBC £89.85

Advanced Memory Systems, Woodside Technology Centre, Warrington WA4 5NG

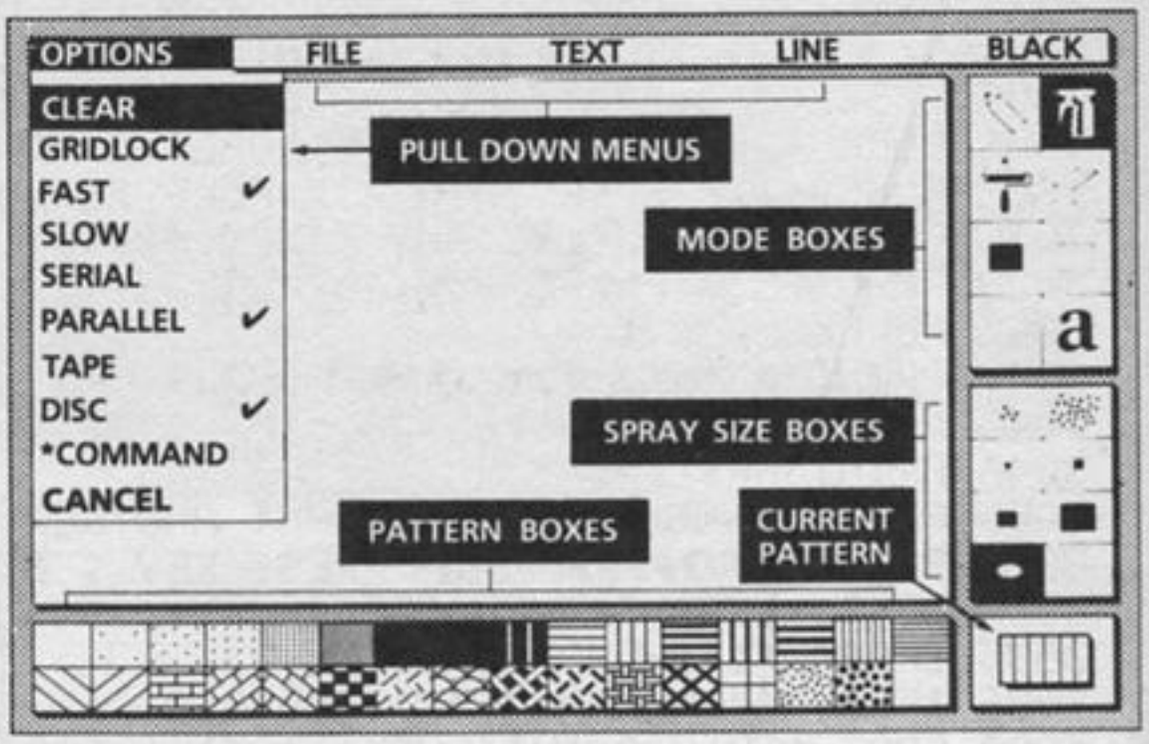
Designers are always searching for alternative methods of telling a computer what you want it to do. The basis of much of this searching is that there is a great deal of difficulty involved in learning to use the QWERTY keyboard. Some years ago designers working for Xerox came up with the idea of using a little device that could be steered by moving it around a desk top. This could then be used to tell the computer what you wanted to do by having it control a little arrow on the screen. This device became known as the "mouse".

The idea was used for a short time and then the designers at Apple took it up and came up with the most revolutionary computer we have seen in the last five years, the Lisa. It was revolutionary because it could be used by anyone within a matter of minutes. It used a mouse for a great deal of its input and all you had to do was move the pointer, by moving the device around the desk top, until it pointed at the picture of what you wanted to do next.

Then by pressing the button on the device's back you had the chance to choose again from a list of possiblities. The picture on screen even looked like a desk with lots of paper and these important little pictures.

The idea has since been used by a number of other manufacturers on busines micros but this is the first mouse designed for the BBC computer and probably the first for any of the home machines. This mouse is a small black box with three red buttons on the front. It is connected to the BBC by a flexible cable and is attached to the User Port. On the underside of the box there are five castors which are really caged ball bearings. The four at the corners are plastic and just for stability; it is the central metal ball bearing which is the real working part.

Before you can use the mouse there is a "mouse support" chip to be inserted on the BBC main board. This provides the user with all the commands required to make the mouse perform its tricks. Packed in the box — one of the best desiged packages that I have seen in this business — are the two manuals and a disc or cassette of driver software for the little beast. Not until this software is installed do you get an idea of the vast range of possibilities the mouse can offer.



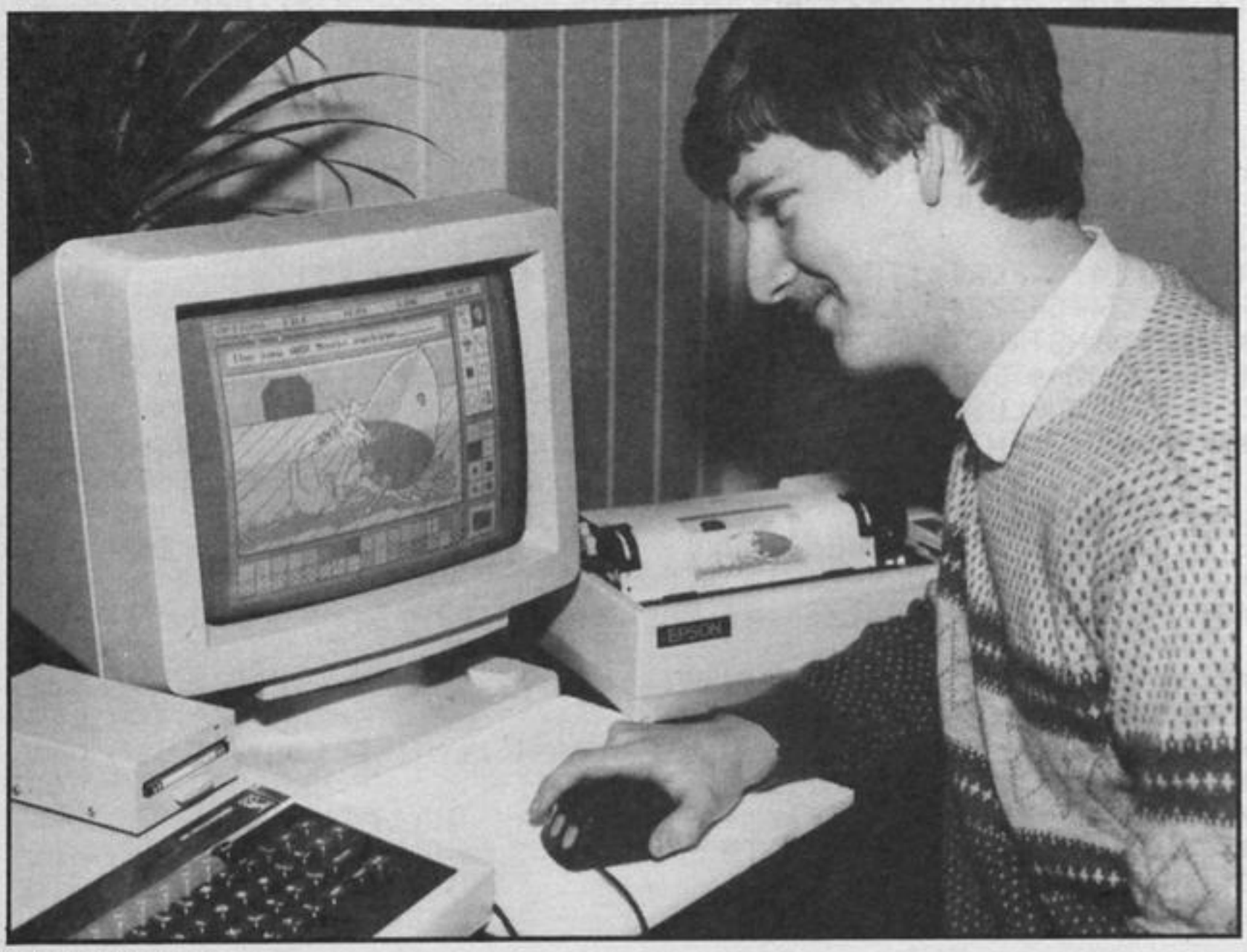
AMX art graphics program

The main part of the software is a drawing program called AMX Art. This has a screen with all the various tones and shades you can use laid out in front of you. There are a whole range of drawing modes. You can use an airbrush technique, lines, circles, fill routines and even rub out.

There are very few words on the screen, however, as you select each option by moving the mouse's pointer to the method you want and pressing the execute button to confirm your choice. It is simplicity itself and there is little doubt that this is the very best of drawing programs for young children. Within seconds my six-year-old son was drawing away and I had to get nasty to get him away from the system.

The pictures, used instead of words, are very important to this method of input and there is a utility program provided which allows you to design your own "icons" as they are known. This too is a very good program rather like a clever character designer program but with a serious program in mind. There are two sets of icons provided for your use but you can create as many more as you wish.

I have only complimentary things to say about this package. It is well designed and executed in almost every respect. It really does make the input of information very simple and foolproof. The mouse itself can be used with commercial programs which are already available, such as word



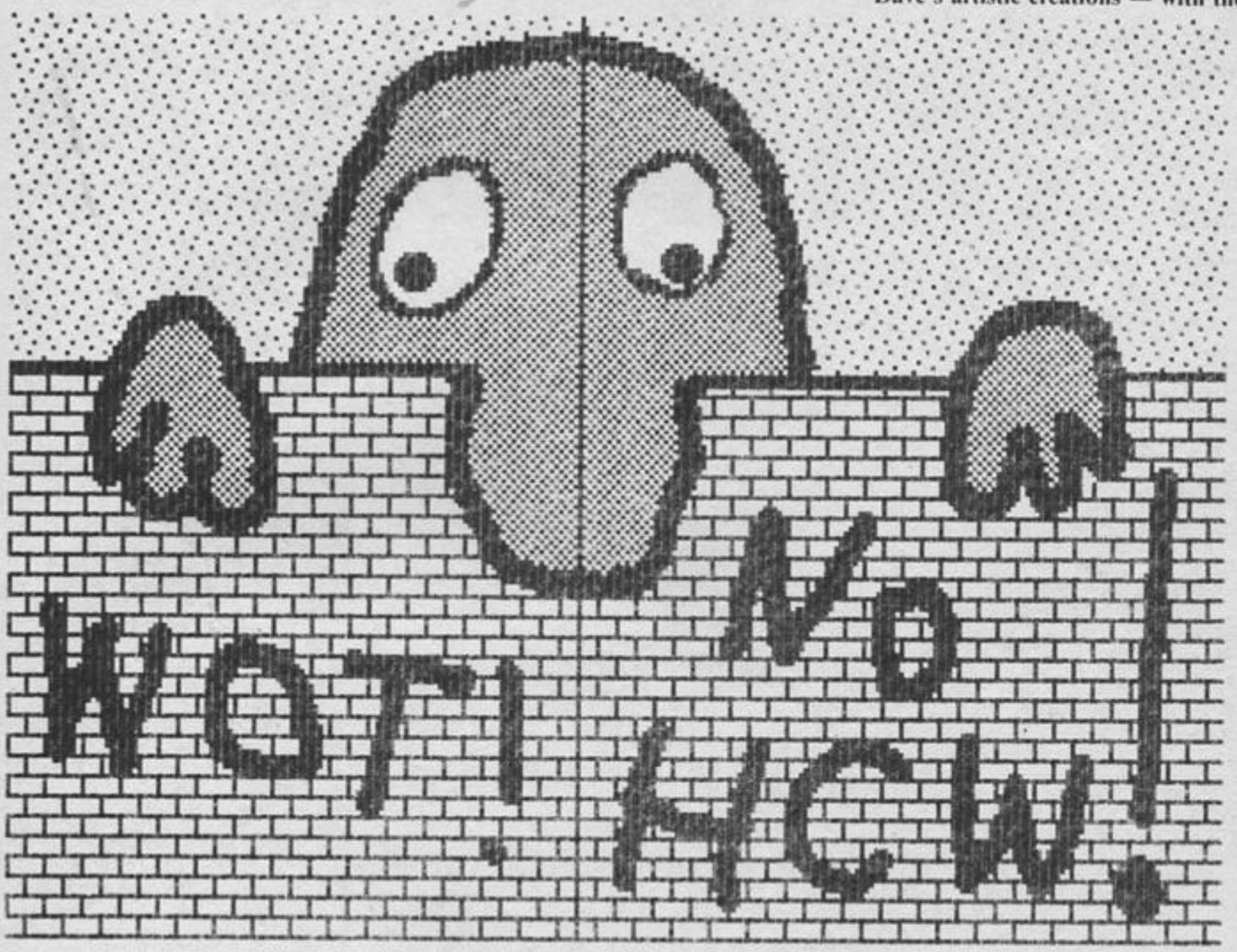
AMX Mouse in use

processors and spreadsheets, but the manual is rather sketchy over how this is best arranged.

If there is a criticism to be made it is that there is very little dedicated software yet available for the creature. This isn't really fair though at this stage. The manufacturers tell us that there are programs being developed which will give this system as full a range of possibilities as are present in the Lisa and Macintosh systems.

A user of the Bitstik package from Acorn popped in as I was playing and he commented that he very much preferred this to the Bitstik although the cost is about one-quarter of the £375 for the Acorn system. This is praise indeed. Get out your traps and go mousing. You won't regret it.

Dave's artistic creations — with the help of the AMX Mouse



Home
Computing
Weekly
45p
every
Tuesday

Trouble in Store
Oric 1/ Atmos 48K
£6.95

Orpheus, The Smithy, Church Farm, Hatley St, George Nr Sandy, Beds

For me, Trouble in Store did not have a good start; it took several attempts to load. However, once it did go in, the game turned out to be enjoyable.

The theme is this — you are the manager of a large store and are troubled with a nightmare. Your products are floating about, and you must rescue the takings in the till. You have to collect a key, then move to the till to collect the day's takings. If you collide with a moving object, then you lose a life, and have to try again. Once you have the money, you jump to the ceiling, and go on to the next screen — the next floor of the store.

Great claims are made about the originality of this game. The idea might be new, but the concept has appeared in other games; but not for the Oric computers. It's fairly amusing, but I'm sure better will come from Orpheus in time. **D.N.**

instructions	70%
playability	60%
graphics	60%
value for money	70%

★ ★ ★

Black Nkight
CBM 64
£7.95

Simulated Interdisc, 249-251 Kensal Rd, London W10 5DB

This is an extremely annoying game. It's a real curate's egg, good in parts, rotten in others.

It says 'press F7 to start', but selecting skill level plunges you straight into the first stage. Pressing F7 has no effect. I have to admit that the graphics are fantastic!

Sixteen sprites are used to animate the Black Knight (it says on the cassette insert) giving amazing results as he pursues his mission. He starts by galloping along, jumping crevasses and pot-holes, but due to lack of operational instructions it took me three goes to discover that it's joystick down (not up or fire) to jump. Then there's timing of the jump, sometimes you appear to land OK but crash, at other times hooves safely pound fresh air.

Mastering that, the Knight dismounts and tries to leap a crevass on foot. Again joystick control is guesswork. Then there are snakes, mazes, the trapdoor-ridden castle and finally the goblin himself to deal with.

The annoying part is that with such brilliant graphics it could be a winner, but there are hoards of irritating details putting you off. Try again Interdisc. **B.J.**

instructions	10%
playability	70%
graphics	99%
value for money	70%

★ ★

Hard Hat Mack
CBM 64
£9.95

Ariolasoft, Asphalte Hse, Palace St, London SW1

Hard Hat Mack is based on the arcade game Crazy Kong. A word of warning: it's touch to play.

The first screen contains five platforms, four with gaps in. You collect the girders, put them in the holes and rivet them with the rivet gun. You may move between platforms by climbing chains or bouncing off the springboard. A lift is available between the top and bottom levels.

The next has three platforms at the sides of the screen and a lift going up and down between. There's also a platform at the top of the lift. You should collect all the tool boxes on the platforms and go to the top level, where a large magnet picks you up.

Screen three has a moving conveyor and a rotating one way lift system along with the platforms. Your mission is to collect the girders and drop them into a rivet machine.

There is a time limit in which you have to finish. There are also other little men to avoid if you want to stay alive.

Quite good although slightly overpriced. **K.I.**

instructions	40%
playability	80%
graphics	80%
value for money	70%

★ ★ ★ ★

Play the part

Do you have a yearning to be a barman or a knight? It's all here

Tapper
CBM 64
£9.95

US Gold, Unit 24, Tipton Trading Est, Tipton, W Midlands DY4 9AH

You're a barman having a terrible time trying to keep your customers happy, by serving them with beer from the pump on the wall. In true American style you have to slide the glass along the bar, and when it's empty it's pushed back to you.

Sounds easy until you realise that on each screen there are four counters with at least two customers on each. Fail to serve one and they turn nasty. You lose a life if you fail to serve, throw too many glasses or let one slide off the bar. Serve all your customers and you move to a bonus screen before being transferred to a different bar. The bonus screen is like Find the Lady but using lemonade cans.

The graphics and sound are well done and the game has the right difficulty levels. It starts hard but not impossible, and then gets tougher, so that you feel as if you have been running through the bars. Watch out for the tips left by the drinkers, and the dancing girls. **M.W.**

instructions	90%
playability	90%
graphics	90%
value for money	75%

★ ★ ★ ★

Fruity Frank
Amstrad CPC464
£6.95

Kuma, Pangbourne, Berks

Acrobatic antics are paramount to avoid and destroy an apparently infinite supply of nasties on the prowl in your fruit garden.

After protecting one garden, you go on to the next more difficult one, with even nastier nasties.

Excellent use of Amstrad's colourful graphics and elaborate sound commands make this game compelling to play and frustrating to finish. An enormous amount of screen activity retains an eye catching display throughout the many pages.

Nasties are caught by Fruity Frank, crushed by an apple being dropped onto them, or, as a last resort, a ball can be thrown at them. All of this has to be accomplished whilst you avoid the Plum and Strawberry monsters dropping on you without prior warning.

Instructions are graphically displayed to a now familiar format. Either joystick or keyboard is used to control Fruity Frank.

When good enough, the results of your efforts are recorded in the Hall of Fame. Score and hi-score features are shown at the top of the screen throughout the game.

Another superb program from Kuma Computers, who really have set an industry standard for quality software. **D.H.**

instructions	100%
playability	100%
graphics	100%
value for money	90%

★ ★ ★ ★ ★

One hundred and eighty!

That's your highest possible score in Richard Kembley's superb darts program. He tells you how it works in great detail, too

How it works

This is an easy program to understand as it relies heavily on variables, and shifts values between them almost all the time. It's split up into many different subroutines but works mainly from the display routine at line 1000, which calls up the player routines, which in turn call up any other routines needed depending on the situation.

The password routine can easily be omitted — just leave out lines 7700-7880. The password stores the codes for each letter in a string W$. When needed for checking, these numbers are re-converted to characters and stored in another string, O$, for comparison with the user's input.

As soon as the comparison is made O$ is blanked so that the password is deciphered for as short a time as possible.

The graphic display of the word "DARTS" can also easily be omitted.

How to use it

After you have entered the password, you will be asked for a starting score which must be ?01, i.e. 101,201,301,401 up to 1001. Next, you must input the two players' names.

After this you will see the main screen display which contains all the information about the state of the game. Below the two names are the current scores of the two players. Below this, **LAST** means the last score obtained. This is to prevent cheating by entering the wrong score.

DIFFERENCE is the difference between the scores followed by the first initial of the leader in inverse video. **180s** is how many maximums have been obtained. **HIGHEST SCORE** is the highest score since the program was first loaded, which is followed by the name of the high-scorer.

HIGHEST CHECKOUT is the highest checkout since the program was loaded. **FEWEST DARTS** is the fewest darts used to finish a single game, followed by the starting score in that game.

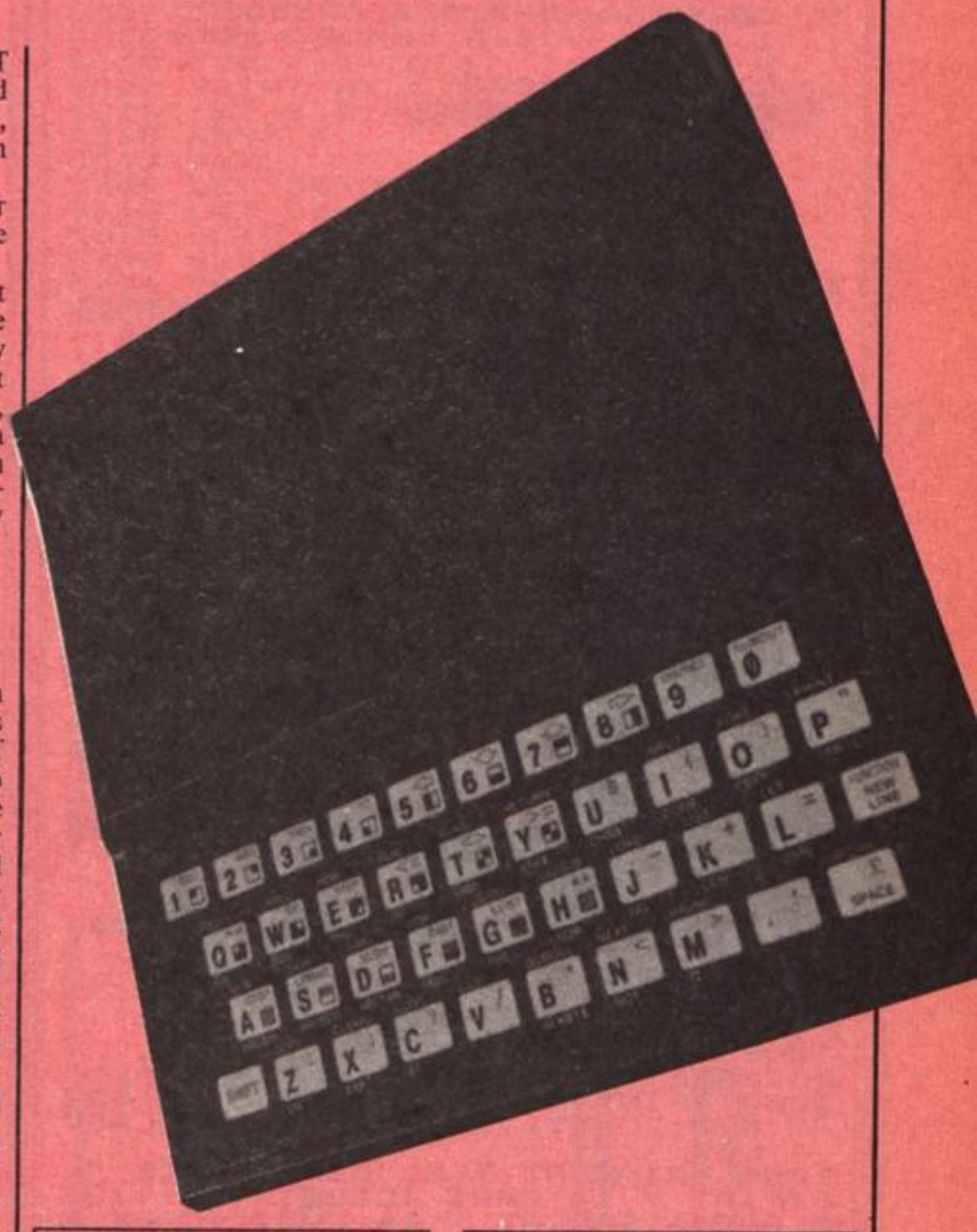
A black area is used for messages, and below that are the input requests.

When you have checked out enter 'F' for finished and the program will ask how many darts you used to checkout out of your last three. If you bust, then enter 'B' instead of a score. At game over, if you decide not to have another game the program will NEW itself.

Hints on conversion

Conversion should be easy with very little change. As long as you have a reasonable grasp of BASIC you should be able to improvise with any parts of the program which your computer won't handle. The command FAST on the ZX81 merely doubles the micro's processing speed, with the disadvantage that the screen display is lost. Any lines which use this command can be omitted as your computer will be as fast or faster than the ZX81 in this mode anyway.

You could always jazz up the program, by adding music for example when the computer is waiting for inputs.

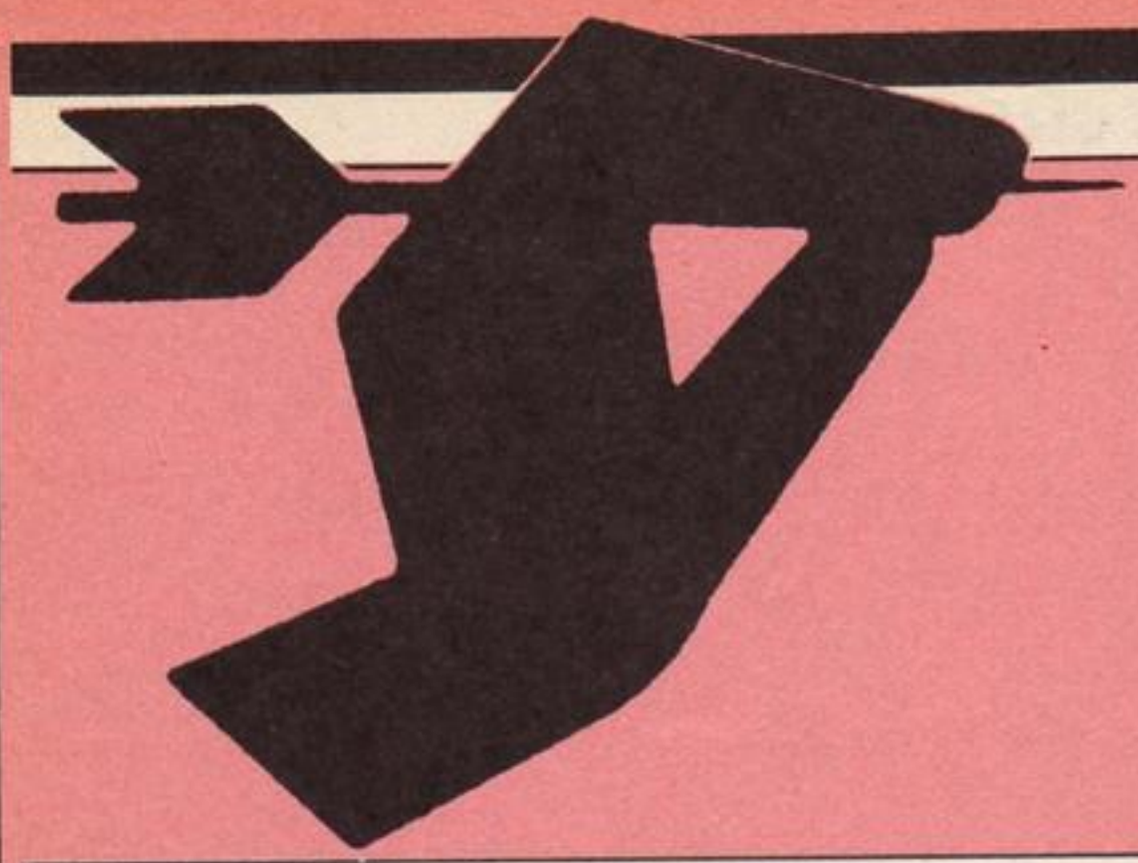


How it works

10-50 control routine
60-140 graphic display of word Darts
500-760 score information routine
1000-1140 scoreboard display routine
1500-1570 player 1 inputs and processes
2000-2090 player 2 inputs and processes
3000-3080 players 1 and 2 name inputs
3500-3650 score and name checking routines
4000-4100 variables
5000-5230 error checking routines
6000-6040 starting score input
7000-7540 end game routine
7700-7880 password routine
8000-8550 end game inputs
8590-8640 save and load routines
8700-8750 silly quip
9000-9120 title screen data, routine

Variables

DA fewest darts used
HIC highest checkout
HI highest score
A$ graphics writing (array)
N$ player 1's name
B$ player 2's name
S1 player 1's score
S2 player 2's score
LS1 player 1's last score
LS2 player 2's last score
F commonly used in loops
080 number of 180's by player 1
T80 number of 180's by player 2
Q$ player 1's score input
DA1 darts used by player 1
DA2 darts used by player 2
DIF difference between two scores
W$ starting score and data for password
**H$** inkey$ storage
CC screen position in password routine
E$ holds password input
O$ holds deciphered version of password
ZZZ input for darts used by player 1
XXX input for darts used by player 2



```
  0 REM ---DARTS SCOREBOARD
  1 REM ---(C)R.KEMLEY 1982
  2 REM ---
  3 LET D$="000"
  4 LET V$="CPU"
  5 LET DA=100
  6 LET HIC=0
  7 LET HI=0
  8 DIM A$(7,160)
 10 GOSUB 9000
 11 GOSUB 7700
 13 FAST
 14 GOSUB 6000
 15 GOSUB 4000
 20 GOSUB 3000
 30 GOSUB 1500
 40 GOSUB 2000
 50 GOTO 30
 60 FOR F=1 TO 7
 70 PRINT AT 3,0;A$(F)
 80 IF INKEY$<>"" THEN RETURN
 90 NEXT F
100 FOR F=6 TO 1 STEP -1
110 PRINT AT 3,0;A$(F)
120 IF INKEY$<>"" THEN RETURN
130 NEXT F
140 GOTO 60
500 PRINT AT 20,0;N$;", YOU REQ
UIRE ";S1
 510 RETURN
 750 PRINT AT 20,0;B$;", YOU REQ
UIRE ";S2
 760 RETURN
1000 IF S1>S2 THEN LET DIF=S1-S2
1002 IF S2>S1 THEN LET DIF=S2-S1
1004 IF S1=S2 THEN LET DIF=0
1007 CLS
1010 PRINT AT 0,0;N$;AT 0,16;B$
1020 FOR F=1 TO LEN N$
1030 PRINT AT 1,F-1;"-"
1040 NEXT F
1050 FOR F=1 TO LEN B$
1060 PRINT AT 1,F+15;"-"
1070 NEXT F
1080 PRINT AT 3,1;S1;AT 3,17;S2;
AT 5,0;"LAST:";LS1;AT 5,16;"LAST
:";LS2
1085 PRINT AT 7,0;"DIFFERENCE:";
DIF;AT 7,14;CHR$ (CODE N$(1)+128
) AND S1<S2;AT 7,14;CHR$ (CODE B
$(1)+128) AND S2<S1;AT 7,14;"■"
AND S1=S2
1090 PRINT AT 9,0;"180/S:";O80;A
T 9,16;"180/S:";T80
1100 PRINT AT 11,0;"HIGHEST SCOR
E:";HI;"  ";V$;AT 13,0;"HIGHEST
CHECKOUT:";HIC
1105 PRINT AT 15,0;"FEWEST DARTS
:";DA;"  ";D$
1110 PRINT AT 17,0;"
                    DARTS SCOR
EBOARD BY R.KEMLEY
                    "
1140 RETURN
1500 GOSUB 1000
1503 IF S1=170 OR S1=161 OR S1<=
160 THEN GOSUB 500
1505 PRINT AT 21,0;N$;", ENTER Y
OUR SCORE."
1507 INPUT Q$
1508 IF Q$="B" AND S1>170 THEN G
OTO 1507
1510 IF Q$="F" AND S1>170 THEN G
OTO 1505
1511 IF Q$="" THEN GOTO 1507
1512 IF Q$="B" THEN GOSUB 8250
1513 IF S1<2 THEN GOTO 1510
1514 IF Q$="26" AND NOT VAL Q$>S
2 THEN GOSUB 8700
1515 IF Q$="F" THEN GOTO 8000
1517 IF CODE Q$(1)>=38 AND CODE
Q$(1)<=63 AND Q$<>"B" AND Q$<>"F
" THEN GOTO 1507
1518 IF CODE Q$>=38 OR CODE Q$<=
27 THEN GOTO 1505
1520 IF VAL Q$=180 THEN LET O80=
O80+1
1525 IF VAL Q$<0 THEN GOTO 5000
1530 IF VAL Q$>180 THEN GOTO 500
0
1535 IF S1-VAL Q$<2 THEN GOTO 15
00
1540 LET S1=S1-VAL Q$
1542 LET LS1=VAL Q$
1545 LET DA1=DA1+3
1550 IF VAL Q$>HI THEN GOTO 1580
1560 GOSUB 3500
1570 RETURN
1580 LET V$=N$
1590 LET HI=VAL Q$
1600 GOTO 1560
2000 GOSUB 1000
2010 IF S2=170 OR S2=161 OR S2<=
160 THEN GOSUB 750
2020 PRINT AT 21,0;B$;", ENTER Y
OUR SCORE."
2025 INPUT R$
2027 IF R$="B" AND S2>170 THEN G
OTO 2025
2030 IF R$="F" AND S2>170 THEN G
OTO 2020
2031 IF R$="" THEN GOTO 2025
2032 IF R$="B" THEN GOSUB 8300
2033 IF S2<2 THEN GOTO 2030
2034 IF R$="26" AND NOT VAL R$>S
2 THEN GOSUB 8700
2035 IF R$="F" THEN GOTO 8500
2037 IF R$="B" THEN GOTO 8300
2038 IF CODE R$(1)>=38 AND CODE
R$(1)<=63 AND R$<>"B" AND R$<>"F
" THEN GOTO 2010
2039 IF CODE R$>=38 OR CODE R$<=
27 THEN GOTO 2010
2040 IF VAL R$=180 THEN LET T80=
T80+1
2045 IF VAL R$<0 THEN GOTO 5100
2050 IF VAL R$>180 THEN GOTO 510
0
2055 IF S2-VAL R$<2 THEN GOTO 20
00
2057 LET LS2=VAL R$
2060 LET S2=S2-VAL R$
2062 LET LS2=VAL R$
2065 LET DA2=DA2+3
2070 IF VAL R$>HI THEN GOTO 2100
2080 GOSUB 3500
2090 RETURN
2100 LET HI=VAL R$
2110 LET V$=B$
2120 GOTO 2080
3000 CLS
3010 PRINT AT 10,0;"O.K. PLAYER
1, ENTER YOUR NAME."
3020 PRINT AT 12,8;"(MAX 8 LETTE
RS)"
3030 INPUT N$
3040 IF LEN N$>8 THEN GOTO 3010
3050 PRINT AT 10,12;"2"
3060 INPUT B$
3065 IF B$=N$ THEN GOTO 3600
3070 IF LEN B$>8 THEN GOTO 3050
3080 RETURN
3500 IF S1=0 THEN GOTO 7000
3510 IF S2=0 THEN GOTO 7500
3520 RETURN
3600 PRINT AT 0,0;"SORRY, NO TWO
 NAMES THE SAME ..."
3610 SLOW
3620 FOR F=1 TO 50
3630 NEXT F
3640 FAST
3650 GOTO 3000
4000 LET S1=VAL W$
```

```
4010 LET S2=VAL W$
4020 LET O80=0
4030 LET T80=0
4050 LET DA1=0
4060 LET DA2=0
4070 LET DIF=0
4080 LET LS1=0
4090 LET LS2=0
4120 RETURN
5000 SLOW
5010 GOSUB 5200
5020 FAST
5030 GOTO 1500
5100 SLOW
5110 GOSUB 5200
5120 FAST
5130 GOTO 2000
5200 PRINT AT 18,0;"  THAT IS AN
 IMPOSSIBLE SCORE.  "
5210 FOR F=1 TO 50
5220 NEXT F
5230 RETURN
6000 CLS
6010 PRINT AT 3,0;"WHICH STARTIN
G SCORE (EG. 501)"
6020 INPUT W$
6025 IF LEN W$<>3 THEN GOTO 6000
6035 IF VAL W$<101 OR W$(2)<>"0"
 OR W$(3)<>"1" THEN GOTO 6010
6040 RETURN
7000 SLOW
7005 CLS
7010 PRINT AT 10,0;N$;" WINS,"
7020 PRINT AT 12,0;"USING ";DA1;
" DARTS,"
7030 PRINT AT 14,0;"AND GETTING
";O80;" 180/S."
7040 PRINT AT 21,0;"ANOTHER GAME
 (Y/N)";AT 21,0;"ANOTHER GAME (Y
/N)";AT 21,0;"ANOTHER GAME (Y/N)
"
7050 IF INKEY$="" THEN GOTO 7040
7060 IF INKEY$="Y" THEN GOTO 13
7070 NEW
7500 SLOW
7505 CLS
7510 PRINT AT 10,0;B$;" WINS,"
7520 PRINT AT 12,0;"USING ";DA2;
" DARTS,"
7530 PRINT AT 14,0;"AND GETTING
";T80;" 180/S."
7540 GOTO 7040
7700 CLS
7703 LET O$=""
7705 LET W$="4942505251"
7710 PRINT AT 0,0;"DARTS SCOREBO
ARD PASSWORD SYSTEM"
7720 PRINT AT 3,0;"PASSWORD:"
7730 LET E$=""
7740 LET CC=9
7750 LET H$=INKEY$
7753 IF H$="" THEN GOTO 7750
7755 IF CODE H$=118 THEN GOTO 78
20
7760 IF CODE H$<28 OR CODE H$>63
 THEN GOTO 7750
7770 PRINT AT 3,CC;H$
7780 LET E$=E$+H$
7790 LET CC=CC+1
7800 IF CC>=31 THEN RUN
7805 IF INKEY$<>"" THEN GOTO 780
5
7810 GOTO 7750
7820 FOR F=1 TO LEN E$
7825 PRINT AT 5,0;"CHECKING";AT
5,0;"CHECKING"
7830 LET O$=O$+STR$ CODE E$(F)
7840 NEXT F
7850 IF O$=W$ THEN GOTO 7870
7860 RUN
7870 LET O$=""
7880 RETURN
8000 CLS
8010 PRINT AT 3,0;"HOW MANY DART
S DID YOU USE ?"
8020 INPUT ZZZ
8025 IF ZZZ>3 OR ZZZ=0 THEN GOTO
 8000
8030 LET DA1=DA1+ZZZ
8035 IF DA1<DA THEN GOTO 8320
8040 IF S1>HIC THEN LET HIC=S1
8050 GOTO 7000
8250 LET Q$="0"
8260 GOTO 1000
8300 LET R$="0"
8310 GOTO 1000
8320 LET D$=W$
8330 LET DA=DA1
8340 GOTO 8040
8500 CLS
8510 PRINT AT 3,0;"HOW MANY DART
S DID YOU USE ?"
8520 INPUT XXX
8525 IF XXX>3 OR XXX=0 THEN GOTO
 8500
8530 LET DA2=DA2+XXX
8540 IF DA2<DA THEN GOTO 8650
8545 IF S2>HIC THEN LET HIC=S2
5550 GOTO 7500
8590 SAVE "DARTS SCOREBOAR"
8600 PRINT " DARTS SCOREBOARD VE
RSION II-RK"
8610 FOR F=1 TO 17
8620 PRINT AT 4,7;"READING VARIA
BLES";AT 4,7;"READING VARIABLES"
8630 NEXT F
8640 RUN
8650 LET DA=DA2
8660 LET D$=W$
8670 GOTO 8545
8700 SLOW
8710 PRINT AT 18,0;"  NOW, BE
D AND BREAKFAST  "
8720 FOR F=1 TO 20
8730 NEXT F
8740 FAST
8750 RETURN
9000 CLS
9005 SLOW
9010 LET A$(1)="
 ▀▀▀
```

Ventures

Peter Sweasey discusses Castle Blackstar, The Scorcerer of Claymourge Castle and Tir Na Nog. He looks back at Kentilla and Return to Eden and gives you clues on other adventures

Welcome once more to Venture, HCW's regular delve into the exciting world of adventures and arcventures (arcade adventures). I am writing from those dark dungeons, with only my elfling secretary Gorand to help me.

This week I shall be looking at Castle Blackstar, The Sorcerer of Claymourge Castle, Tir Na Nog and, briefly, a retrospective of Kentilla and Return to Eden. There is help with Level 9 Games, Pyjamarama and Knight Lore.

So, straight to work. Castle Blackstar was originally released at the beginning of 1984, by SCR Adventures, for me a local company. Now CDS is marketing it, in new packaging and with a new price — much better at £6.95. It is next only and in the classic adventure mould — you wake up one day in a luxurious room, to be told by Lady Artemis, a beautiful woman, that you must locate an orb and take it back to her You can keep any other treasure you may find. Suddenly you are on the road to Castle Blackstar, surrounded on all sides by forest.

I walked along, and after an unpleasant encounter with a difficult-to-map forest. I found and entered the castle. It is quite a big place with enough problems to keep most people going: yet I found them maybe just a bit too simple. Presentation is very clear — better than even Level 9 — and though the descriptions are nothing to write home about, they are adequate and sometimes display humour. Vocabulary is good. Strangely, QUIT blanks the computer — RESTART performs the function I was expecting, although the inlay does not tell you this. Help is available from CDS by post.

Castle Blackstar is a very traditional program which has nothing special or new to offer. However, it is cheaper than most and is quite fun. Maybe a good game for those new to text-only adventures, or those waiting for the next Level 9 game. Ventures rating: XXXX. At present available for the Spectrum and MSX, other computers soon.

A new sort of arcventure is what Tir Na Nog has to offer. The title is Gaelic for Land of Youth, the Celtic Other World. You play the great Hero Cuchulairn, who is now dead and trying to recover the four pieces of the Seal of Claun. This entails travelling through the land, seeking help from the more friendly inhabitants and avoiding the evil ones. There is a very large network of paths crossing forest, plains, mounds and icy wastes, all the sort of things you expect in a game like this. Objects lie around the floor and there are seemingly thousands of doors all leading to a different area of the land. Some need a key, naturally.

Where this game stands out from the rest is its graphic quality and quantity. There is very little text, most of the screen being devoted to a beautiful, full colour picture. In the centre of this is the Hero, and as you walk left or right the screen scrolls accordingly, to reveal yet more great graphics.

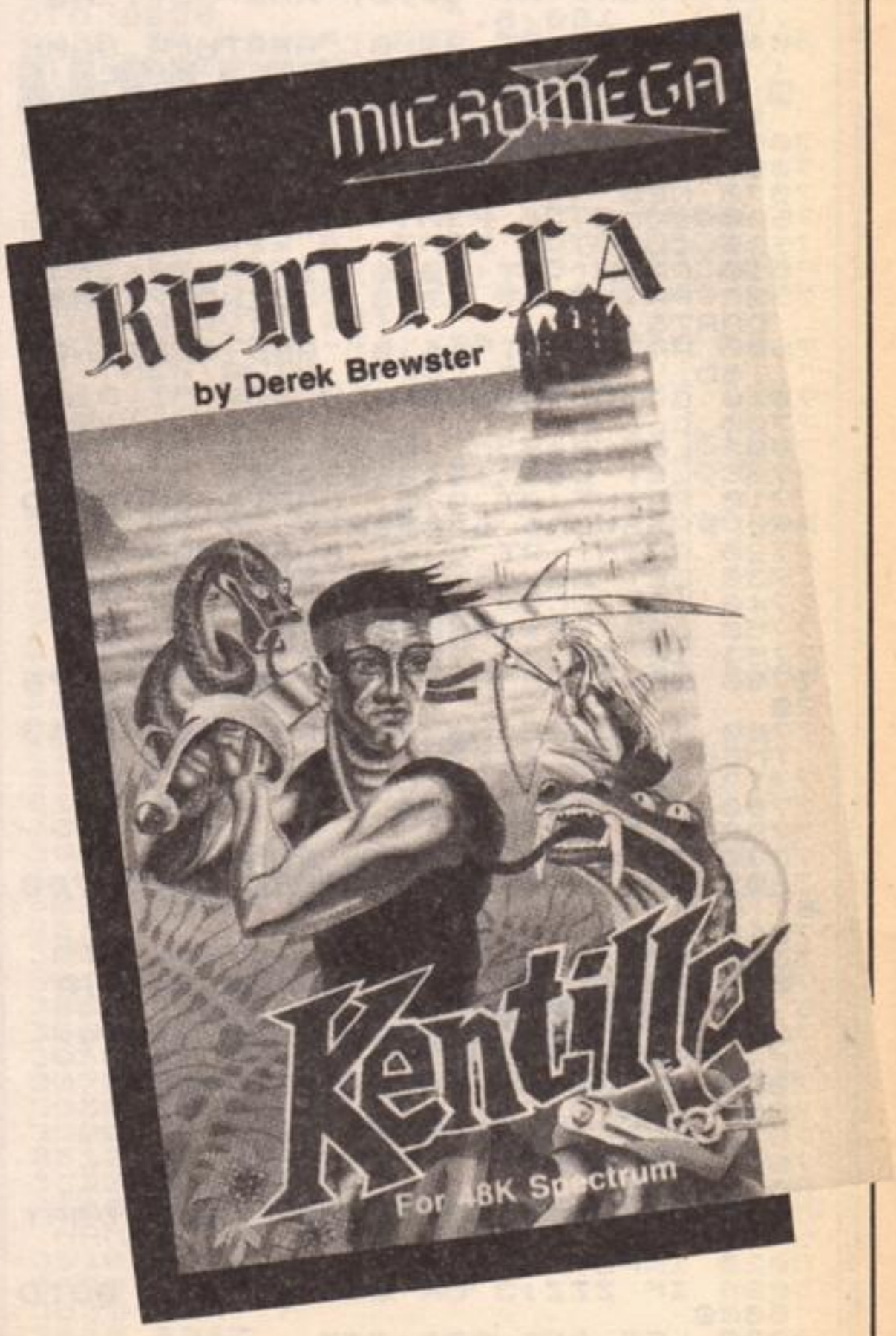
The program's producer, Gargoyle Games, describes Tir Na Nog as a computer movie, and this is, for a change, a justified claim Cuchulairn is wonderfully animated, seven characters high with hair blowing back due to an unseen wind. It's similar to controlling a cartoon.

However (why does there always have to be a however?) good graphics do not make a good game. I have several gripes. Firstly, I was annoyed by its stubborn refusal to load with my usual tape recorder. Then I discovered it crashed on pressing the wrong key, or went into an enescapable loop (this happened several times). Movement is difficult, due to having to fiddle with changing 'camera angles', and takes a lot of practice.

Above all, the content seemed to bore many of the people I showed the game to. Moving around the paths, which all look similar, takes ages and is difficult. Maybe mapping would help, but I felt the program lacked sufficient incentive for the player to carry on.

It comes in an Ultimate-style box with a very readable instruction booklet, from Gargoyle Games of Birmingham. So far only available on the Spectrum, Tir Na Nog costs £7.95. Ventures rating: XXX — interesting.

Scott Adams is the (self) proclaimed King of Adventures. Certainly his Adventureland helped set the ball rolling all those years ago. After the Hulk and Spiderman he returns to more familiar adventure territory with Sorcerer of Claymourge Castle. You play Beanwick, a wizard's apprentice who must penetrate Claymourge Castle and retrieve the 13 stars of power, captured by evil Vileroth. You carry with



you a selection of interestingly named spells, the first of which you cast almost at once. Being a mere apprentice though, some of the results are unpredictable.

If your computer has sufficient memory there are some excellent graphics. Text, however is short, and there are not very many locations. As with most Scott Adams games, the main feature is the numerous selection of intriguing, difficult puzzles, which are fun to try to solve. Vocabulary is limited, but screen presentation good: better than The Hulk.

Although competently programmed, Sorcerer is not really worth £9.95 in my opinion. There are many better adventures out with more interesting scenarios. If you like pretty pictures, or really want some very tricky puzzles, maybe it's worth it. Otherwise, Ventures rating of only XXX. Published by Adventure International, available for most major home computers.

If you have £10 to spare and want a really good adventure, the best buy must be the amazing Return to Eden from Level 9. Level 9 is to adventures what Ultimate are to arcventures — simply superb. The program has been reviewed previously in the main magazine, so I shall not repeat what was said then.

Suffice to say it is pure enjoyment, with a fluid and intelligent plot. The input routine is the best ever; you can now type in several commands in a row and watch the result on screen. Vocabulary and sentence construction are both very good; and descriptions are, as usual, as good as a novel. It comes with full instruction booklet and in a large box. I am also glad to see the program has had a wider distribution deal than usual: hopefully even more people will become hooked. Ventures rating XXXXX — perfection? £9.90 for most home computers.

A sharp contrast in my opinion, is Kentilla: £6.95 for the Sepctrum from Microwega. This was also reviewed in the main magazine, but this time I disagree with my colleague. Although the game introduces some welcome innovation, it has some much more serious flaws. All this is a surprise since the game is written by Derek Brewster, a fellow adventure critic.

Firstly the scenario is, yet again, a middle earth, sword and sorcery type, with totally forgettable names like Grako, Ashka and Algrath cluttering up the story. Loading took me ages, the high frequency would not work on my normal recorder — and once in I remained unimpressed. Text is far too brief, particularly as the pictures are small and I feel, slightly dull. However, the main flaw is the input routine. Although it offers some complex features I found it very hard to use, since it will not accept my relatively fast typing pace. For example, I tried typing INVENTORY and IVETRY appeared on the screen! Although it will accept abbreviations to two letters, I still had to pause between each letter. Very frustrating! Screen presentation is poor, also, with overuse of capital letters.

It is one of the cheapest graphic games around though. Still I'm afraid the Ventures rating is: XX — poor. Maybe the pubic disagree — write to me (or Gorand, she's more sympathetic!) if you do.

Now the helpline. Giving help with Level 9 games always seems to spoil the fun, but if Santa brought you Return to Eden you may be stuck. Well, for those who have given up very early, mole hills are Doug's favourite places! Those in passages being snowballed with fireballs need a rest — but are you carrying what's needed for a comfortable snooze? Past these stages the game becomes even better.

Pyjamarama is still causing some people problems. The magnet is in the box — but first you need the ignition keys to take the crash helmet. This in turn will lead you to the library book — take the scissors and with a little 'help' you can float to the box key.

Knight Lore, which I suspect was dropping down chimneys in vast numbers this year, also requires careful thought. The objective is to drop the required objects in the wizard's cauldron — but only Sabreman can see what is needed (it will appear in the 'broth'!) Some rooms look empty, but often objects are hidden under blocks which vanish when jumped on.

That's it for this week. — I will get to your letters eventually — So keep writing, with help, for help, or to express your opinion.

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Printing with the QL

Colin Wilton-Davies, HCW regular contributor, discusses the merits of various QL printers

Most readers know that the QL is fitted with two RS232 serial ports which may be used to control printers, modems and similar devices. The Psion software bundled with the QL has facilities for using printers via these ports. In spite of these factors, which should make life easier, I find myself answering more questions about printers for the QL than about any other single aspect of the machine.

Let's begin with deciding what sort of printer to use with the QL. The two main kinds I shall consider are the daisy-wheel and the dot-matrix. The first is rather like a computer-controlled electric typewriter; the typehead revolves rapidly in front of the inked ribbon, and when the required character is in place, a hammer strikes the head against the ribbon with the paper behind. Typeheads are easily exchanged, print quality is excellent, but these printers are slow and will print only very limited graphics.

Dot-matrix printers work by hammering pins against the ribbon; each pin makes a dot, and characters are made up as a pattern of dots. These printers are much faster and will print graphics as well as text; the text quality is not as good as that from a daisy-wheel.

Prices of both sorts overlap, but dot-matrix printers tend to be cheaper. Graphics are important to me, so I decided on a dot-matrix printer. I wanted to use the QL for business letters as well, so was prepared to buy something better than the cheapest dot-matrix printer. Some dot-matrix printers print electrically rather than mechanically, and therefore need chemically-treated paper. These machines are often extremely quiet, an attractive point. After much thought and many demonstrations, I decided that special paper was too limiting; I particularly needed to do cassette labels and thick paper from time to time.

My list eventually shortened to two makes, Epson and Mannesmann Tally. Some other makes had good specifications, but I felt it was important to buy locally rather than by mail-order. Experience has taught me that anything with moving parts will eventually give trouble, and printheads really shift! The Mannesmann Tally MT80 was slightly cheaper than the Epson equivalent, so I settled for the MT80.

The standard interface with either printer is a Centronics or parallel one; the QL has two serial ones. I had to buy a serial-to-parallel converter for either the computer or the printer. Several are made for the QL, but were not available locally. I also had visions of being passed around three different manufacturers if there were compatibility problems!

I bought the RS232 card for the MT80; this has a 2K buffer, and will accept characters at a rate of 9600 baud, the default rate for the QL. I found it very easy to install and to set the switches for the parameters given in the QL User Guide. The two machines were linked with the cable that Uncle Sir Clive had offered as consolation for the long wait for my QL, and it all worked. Eventually.

I connected the cable to the QL port labelled "SER1", and listed a SuperBASIC program with the command "SAVE SER1"; fine. The 2K buffer allowed me to start another task before the printing finished. The printer wouldn't work if I used SER2 instead, and I found that the Psion software didn't take much interest in SER2 either. One might expect to output to SER1 (OK) and to keep SER2 for input (no!); if you tell QUILL you want to LOAD or IMPORT from SER2 (or NET1), it looks for a file called "SER2" (or "NET1") on mdv2! But plain text from QUILL was no problem.

At this stage, it was necessary to tinker with the software. QUILL, ABACUS and ARCHIVE can do fancy things like underlining, emphasising, superscripts and subscripts. So can my MT80. Communication between the main program and the printer is organised by a piece of software called a "printer driver". This beast is necessary because different makes of printer use different control codes to do different things.

I was lucky; the MT80 uses the same control codes as the Epson FX80, and Psion has written a driver for that. This was brought into action by running a SuperBASIC program called "install-bas" which comes on the QUILL cartridge. The information section of the QL User Guide tells you exactly how to do this, and I was able to configure a driver for the Tandy DMP-100 printer just for fun. The end result is a file called "printer-dat" which must be copied to the ARCHIVE and ABACUS working cartridges before they can fully use your printer.

Note that I do not include EASEL. The printer driver which EASEL uses is called "GPRINT-RPT" (whatever the editor of QLUB News says!). It is written to dump a graphics screen on to a printer, is written for the Epson FX80 and has no equivalent to "install-bas" for modifying it for other printers. It can be POKEd to modify it for use with a Brother HRS, but I didn't have to do anything; it can't distinguish betwen an FX80 and an MT80.

GPRINT-PRT can also be used to print graphic screens from SuperBASIC programs, and does an excellent job of it. Each colour on the screen is shaded differently on the printout. Strangely, it reverses black and white, so it is best either to use white INK and black PAPER on screen, or use the RECOL command to reverse the screen before printing.

Back to text. I soon found that there were abilities of my printer which weren't being utilised by QUILL and the other text programs. for instance, it would print condensed characters 142 to a line. You can get a lot more of a spreadsheet in 142 columns than in 80. It isn't difficult to insert the proper codes in the "preamble" with "install_bas", but it is a bit of a fiddle to keep switching between different drivers if you want to do it fairly often.

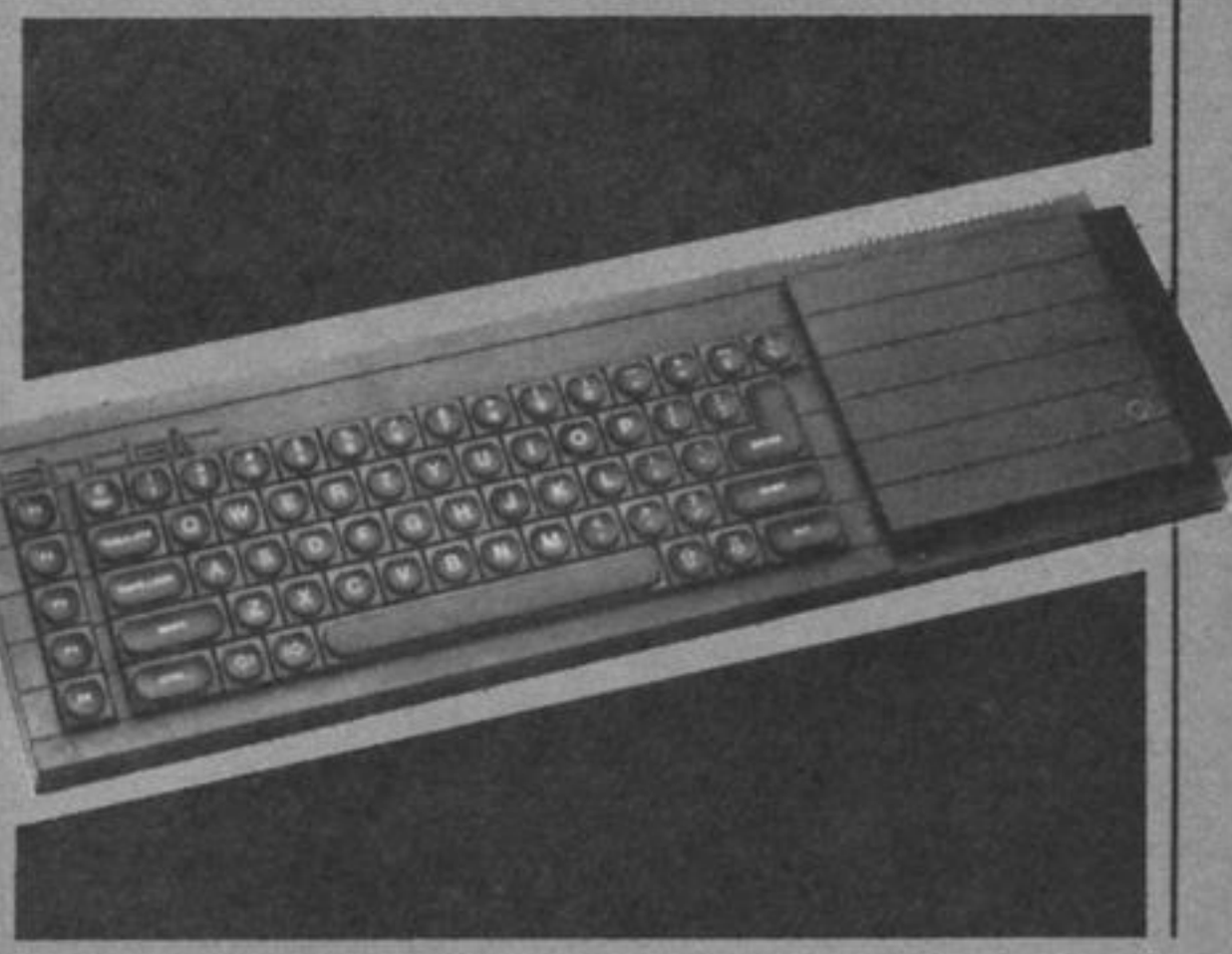
Here's a tip to make this easier. You will have to modify two programs on the QUILL tape. They are called "boot" and "install_bas" respectively, and are both SuperBASIC. It would be prudent to make copies of them first (use other names and cartridges for these back_ups). Now remove the QUILL cartridge, press RESET and either F1 or F2; reinsert the cartridge when the LED on drive 1 has gone out — you are now in SuperBASIC. Key in the instructions "LOAD mdv1_boot" and "LIST". Insert the following SuperBASIC instructions at the very beginning:

```
10  PRINT "Change Printer
    Driver (y/n)?";
20  a$ + INKEY$(×1)
30  IF a$ + + "y" THEN RUN
    mdv1_install_bas
```

Now DELETE mdv1_boot (you *did* make a backup, didn't you?), then SAVE mdv1_boot. Now LOAD mdv1_install_bas, and EDIT line 314 by deleting the STOP instruction at the end of the line. EDIT line 315:

```
315  LRUN mdv1_boot:END
     DEFine
```

DELETE mdv1_install_bas, SAVE mdv1_install_bas. Now every time you LRUN mdv1_boot, you have the opportunity of changing your printer driver before using QUILL. Delete drivers you will never use, and make new ones called "small" for condensed letters, "large" for enlarged letters, "french" for one of the foreign alphabets and so on.



Words, words, words...

In part three of David Ellis's series, you'll learn how to add more words to your RSX

Having set up the RSX in last week's article, it's now time to add some new words. The machine code routines for these new words are all very simple. They are basically the same — a CALL to a routine which is listed in the 'jumpblock'. This jumpblock contains the actual calls to some of the more useful routines on the ROM. These are listed in full in Amstrad's Firmware Manual — a hefty £20-worth. Most of the BASIC machine code routines aren't listed in this manual so don't expect the earth for your money!

To set up these new words first enter the initialisation program — see last week's article. RUN the program then NEW it. Now load in the program given last week and RUN it.

Table 1 shows the list of words, together with their associated machine code routine. Apart from PARAMETER, all the routines are only four bytes in length. Enter PARAMETER, and then the numbers for PARAMETER separately.

Then enter the following names and numbers in a similar manner. When you have entered all the words and numbers press the 'S' key to make a copy of the RSX on to tape. The program should now end.

Now, to test the words first initialise the RSX with:

```
CALL &7D00
```

Remember when trying out the words to precede them with the bar sign. Here is a description of what these new words do:

KEYWAIT: The execution of a program will be halted until a key is pressed. The word could therefore replace the following familiar line:

```
10 A$ = INKEY$ : IF A$ ="" THEN 10
```

with:

```
10 |KEYWAIT
```

CURSOF: As you may have guessed, this will turn the cursor off. This will only occur during a program and not in the immediate mode. Useful for suppressing the cursor on INPUT statements.

INVERSE: This will swap the current PAPER and PEN inks. Useful for highlighting words as in the following line:

```
PRINT "This is ";:|INVERSE
  :PRINT " INVERSE ":|
  INVERSE
```

GRAPHIC: This will initialise the graphics VDU as follows:

1 sets graphic VDU indirections to their default routines.
2 sets graphic PAPER to INK 0
3 sets graphic PEN to INK 1
4 sets user origin to bottom left hand corner i.e. 0,0
5 moves current position to 0,0
6 sets graphic window to cover the whole of the screen

As you can see, this is quite a powerful command. It doesn't clear the graphics VDU so it is very useful for resetting things if you lose track of your position and the ink colours during a graphics routine.

CLEAR: This will clear the whole of the screen memory to zero, thus clearing the screen. The difference between this command and CLS is that the cursor position is not changed. The screen offset is also set to 0.

CASON: This simply turns the cassette motor on, useful for locating a position on the tape without using the CAT command. A slight delay of a few seconds will occur before returning to BASIC.

CASOF: You've guessed it! This will turn the cassette off.

Of course both CASON and CASOF could be put to good use if a speech track was recorded on the tape in between programs. These could be switched on and off by these commands and synchronised by using Amstrad's interrupt facility.

If you have entered everything correctly then these new words will now become part of your BASIC, provided that the RSX has been initialised, of course. If they are not then here is a full recap of the procedure:

a set the top of BASIC by: MEMORY &7CFA
b load in the BINARY file with: LOAD " NEW WORDS " (or the filename you gave it)
c once the file has been loaded enter: CALL &7D00

The RSX should now be initialised and the new words available for your use.

If you are starting from scratch then:

1 RUN the first program in the second article
NEW the program
3 RUN the second program in the second article
4 Enter the name of the new word
5 Enter the machine code numbers one at a time for that word
6 Enter 'W' to create another word — go to step 4 or...
7 Enter 'S' to save the RSX file to tape (also called the BINARY file)
8 Repeat from step 3 if you wish to add more new words or go to next step
9 CALL &7D00 to initialise the RSX
10 The new words can be used if preceded by the bar sign

Once an RSX file has been created on tape then steps 1 and 2 should not be required again unless you wish to start from scratch. To use the new words when first switching on then follow steps a, b, and c, as shown above.

If you want to add more new words (like next week!) then follow steps a, b, and c, and steps 3 to 8. As all the various pointers are stored on the RSX file, new words and their subroutines will be added at the correct position.

Next week we will see how various parameters can be passed to and from machine code routines and take a look at some more new words.

Table 1. New words

Address	Word name	Machine code numbers
&828C	PARAMETER	DD 7E 6 DD 46 5 DD 4E 4 DD 56 3 DD 5E 2 DD 66 1 DD 6E Ø C9
&82A2	KEYWAIT	CD 6 BB C9
&82A6	CURSOF	CD 84 BB C9
&82AA	INVERSE	CD 9C BB C9
&82AE	GRAPHIC	CD BA BB C9
&82B2	CLEAR	CD 14 BC C9
&82B6	CASON	CD 6E BC C9
&82BA	CASOF	CD 71 BC C9

Addresses: These are the addreses where each machine code routine starts.

Machine code numbers: These are the numbers to enter for each of the machine code routines.

War games galore

You've got a chance to try out many different battle techniques with this selection of war game programs

Curse of the Seven Faces

Imperial, 153 Churchill Rd, Parkstone, Poole, Dorset

This text adventure has on offer all the usual ingredients of dark caverns, interlinking rooms, objects to be picked up and discarded, secret messages, and rather boring text (no graphics of any sort to brighten up the screen).

For those wanting to try an adventure game for the first time, this doesn't stand out from the crowd, and for the experienced adventurer, it's all too easy.

It isn't all bad. You can 'speak' to it with more than two words at a time. The program will accept propositions, so communication is closer to real English than most adventures. Pressing 'I' will present you with an inventory of all the items you have picked up on the way. There is a 'help' option which is supposed to give a hint of what to do next should you get stuck, but all it ever gave me was 'You shouldn't need any help' — thanks!

You also get the option to save a game on tape, but I can't imagine many wanting to come back to it! **D.N.**

instructions	40%
playability	30%
graphics	10%
value for money	30%

★

War Zone Amstrad CPC464

CCS, 14 Langton Way, London SE3 7TL

Whilst I would still claim to be a non-violent pacifist I have to admit that I rather enjoyed playing this and that I will have another go soon.

This company specialises in simulation software and I'm glad that this war game isn't more realistic. It's really a computerised board game with the computer playing the role of opponent.

You see on the screen one of the nine sectors of the battlemap and there are shapes to represent your artillery, infantry and tanks. There is also information about terrain and minefields displayed on the map in graphical form. In each turn you can move each piece up to set numbers of squares depending upon the starting terrain and fire from either your starting or finishing position.

I found it difficult to keep track of my army and would have liked to see the full battleplan on occasions. You are prevented from seeing any sector where you have no pieces, and this means that an ambush is possible.

Overall this is well designed and fun, it doesn't have arcade graphics, but it doesn't need them. **D.C.**

instructions	95%
playability	90%
graphics	80%
value for money	90%

★ ★ ★ ★ ★

Raid on Bungeling Bay CBM 64 £9.95

Ariolasoft, Asphalte Hse, Palace St, London SW1

There are six factories scattered over a group of islands. These must be destroyed along with all defences and suppliers before they complete the construction of the ultimate weapon.

The screen displays an overhead view of the islands as you fly in your helicraft. The picture is very clear although I think it could have included more detail. A small radar marks the positions of the enemy, which you must blow up. You need a colour TV/monitor to play successfully because everything is colour coded.

You must blow up tanks, boats, radars, planes, factories and battleships. The battleships may also be destroyed when still in construction. If you meet one after it is built it fires heat-seeking missiles from which there is no escape.

Once your damage reaches a critical stage or you run out of bombs, you should return to your aircraft carrier for repairs and re-load with ammunition.

The instructions are not good enough — they tell you how to partially destroy a factory, but not how to fully destroy it. For this reason I have not got through the first level. **K.I.**

instructions	20%
playability	80%
graphics	80%
value for money	75%

★ ★ ★

Havoc 48K Spectrum

Dynavision, PO Box 96, Luton LU3 2JP

Some superb screen shots adorn the packaging, but in tiny letters at the bottom, you discover that they're from the CBM 64 version.

This purports to be a magical 3D missile steering game, where you view from a 45 degree angle above as your missile flies across the screen. There's lots of perspective to give it depth.

Sadly, it's nothing like the picture. It has two colours, blue and white. As a result, it's difficult to tell where you are, let alone steer. The movement is flickery and the graphic outlines crude. Should you get through the first barrier, difficult in itself, and loose off some flickering shots at a fuel dump, the program crashes to reveal that it's a BASIC managed machine code job! No wonder it flickers!

In the hands of an expert Spectrum programmer this would be an absolute winner. As it is, it's a very crude 'conversion' which appears to bear no relation to the claims on the package. Very, very disappointing. Doesn't Dynavision know about the Trade Descriptions Act? It's not good enough to say 'Spectrum version will differ.' **D.M.**

instructions	70%
playability	25%
graphics	25%

★

Choplifter CBM 64 £9.95

Ariolasoft, Asphalte Hse, Palace St, London SW1

Hostages have been captured and sixteen are being held in each barrack. One of the barracks has been blown open and, using your chopper, you must collect the hostages and return them to the Post Office.

Tanks and aircraft fire at you. You should either avoid or shoot at these.

A nice touch is that the men stand and wave if they see you, as you land they come and climb on board. You may fly in all directions and rotate through 180 degrees to fire at whatever you want to hit.

The graphics do not include any fantastic effects, they are simple and straightforward. The game could hae been improved by having a 3D type background to give it depth, it is very plain as it is.

The program comes recorded on chrome tape and loads without problems. The instructions are adequate — there is not much to explain.

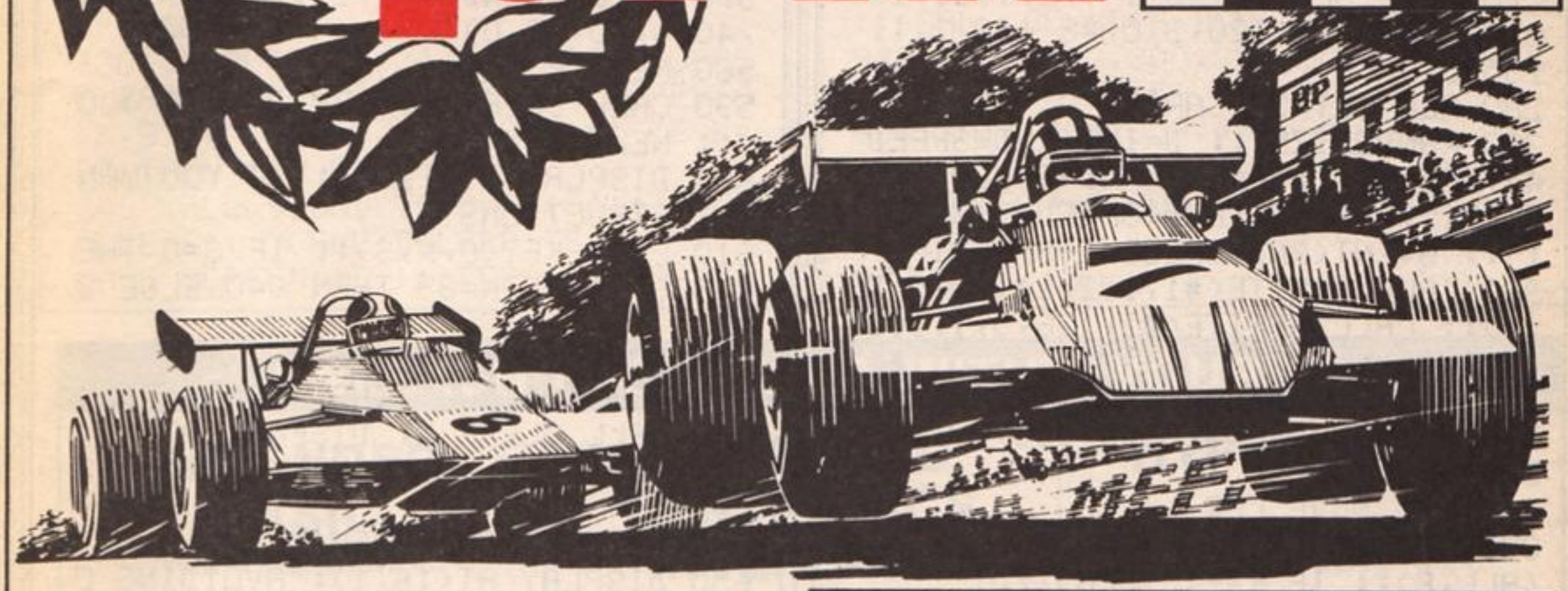
You are given a chance to win a SX64 in a free competition which you can enter when you buy the game. A voucher also allows you discount off certain CBM 64 peripherals. **K.I.**

instructions	30%
playability	70%
graphics	60%
value for money	60%

★ ★ ★

TI-99/4A PROGRAM

Grand prix



The race is on! Overtake all the competitors — but watch out for oil slicks — in Colin Ashworth's game for the TI-99/4A with Extended BASIC

Take your place behind the wheel for this fast-moving racing game for the TI-99/4A with Extended BASIC.

After the introduction, you will be asked to choose your skill level, which is from one to three. One is the easiest and three the hardest.

Now the screen clears and the track is set up. Your car appears at the bottom of the screen and you must overtake all the other cars — but watch out for oil slicks!

You must race as far as you can without crashing. If you find the game is too fast, alter the speeds in lines 740, 750 and 760.

If you crash, the screen clears and prints your score as well as the highest score to date.

How it works

100-170 define characters
190-210 define colours
220-230 set up screen
240-260 set up oil slicks
270-310 set up cars
320-440 move car
450-620 introduction
630-670 instructions
680-760 select skill level
770-830 crash routine, into cars or oil
840-890 crash into barrier routine
900 start of game
910-970 plays national anthem

Variables

I,B,C,D,E,F,G random position of cars
#1 to #4 racing cars
#5 your racing car
#6 #8 oil slicks

```
100 REM DEFINE CHARACTERS
110 CALL CHAR(33,"1A6F55CEBD5A6F
1A")
120 CALL CHAR(40,"FFFFFFFFFFFFFF
FF")
130 CALL CHAR(128,"1F101F01C2FCF
9C808E8F8F8EF011F1FF808F880433F9
F9390171F17F780F8F8")
140 CALL CHAR(132,"1F101F01C2FCF
BCA0BEAFBF8EF011F1FF808F880433FD
F53D057DF17F780F8F8")
150 CALL CHAR(136,"1F101F01C2FCF
9C909E8F8F8EF011F1FF808F880433FD
F53D0575F17F780F8F8")
160 CALL CHAR(140,"3C7EFFFFFFFF7
E3C")
170 CALL CHAR(124,"34599D45B5AC7
CBF7EFF7EFFCA425149")
```

```
180 GOSUB 460
190 CALL COLOR(1,13,1)
200 CALL COLOR(2,16,1)
210 CALL CLEAR :: CALL SCREEN(4)
:: CALL MAGNIFY(3):: SCORE=0
220 REM SET UP SCREEN
230 CALL VCHAR(1,7,33,24):: CALL
 VCHAR(1,26,33,24):: FOR I=8 TO
25 :: CALL VCHAR(1,I,40,24):: NE
XT I
240 REM SET UP OIL SLICKS
250 CALL SPRITE(#5,128,2,155,117
,0,0):: FOR I=1 TO 100 :: NEXT I
260 RANDOMIZE :: I=INT(RND*SPEED
4)+SPEED1 :: B=INT(RND*SPEED4)+S
PEED1 :: C=INT(RND*SPEED4)+SPEED
1
270 CALL SPRITE(#6,140,2,1,80,I,
0,#7,140,2,1,120,B,0,#8,140,2,1,
155,C,0)
280 REM SET UP CARS
290 RANDOMIZE :: D=INT(RND*SPEED
4)+SPEED1 :: E=INT(RND*SPEED4)+S
PEED1 :: F=INT(RND*SPEED4)+SPEED
1 :: G=INT(RND*SPEED4)+SPEED1
300 CALL SPRITE(#1,132,11,1,60,D
,0):: CALL SPRITE(#2,136,5,1,100
,E,0)
310 CALL SPRITE(#3,132,13,1,130,
F,0):: CALL SPRITE(#4,136,7,1,17
5,G,0)
320 REM MOVE CAR
330 CALL KEY(0,K,S):: CALL COINC
(ALL,R):: IF R=-1 THEN 770
340 CALL POSITION(#5,E,J):: IF J
<45 THEN 840 ELSE SCORE=SCORE+1
350 CALL POSITION(#5,E,J):: IF J
>190 THEN 840 ELSE SCORE=SCORE+1
360 IF SCORE>HSCORE THEN 370 ELS
E 380
370 HSCORE=SCORE
380 IF S=-1 THEN 330
390 CALL COINC(ALL,C):: IF C=-1
THEN 770
400 IF S=0 THEN CALL MOTION(#5,0
,0):: GOTO 330
410 IF K<44 OR K>46 THEN 330
420 CALL MOTION(#5,0,(K-45)*SPEE
D5):: CALL COINC(ALL,C):: IF C=-
1 THEN 770 ELSE 330
430 CALL MOTION(#5,0,(K-45)*40):
: CALL COINC(ALL,C):: IF C=-1 TH
EN 770 ELSE 330
440 GOTO 330
450 REM INTRODUCTION
460 CALL CLEAR :: CALL SCREEN(16
)
470 DISPLAY AT(12,5):"G R A N D
  P R I X" :: DISPLAY AT(13,5):"
**********"
480 DISPLAY AT(14,14):"B Y" :: D
ISPLAY AT(15,14):"***"
490 DISPLAY AT(16,8):"COLIN ASHW
ORTH" :: DISPLAY AT(17,8):"*****
*********"
500 FOR N=1 TO 4
510 CALL SOUND(60,220,8,-5,0)::
CALL SOUND(60,220,8,-5,5)
520 NEXT N
530 FOR F=1000 TO 2000 STEP 15
540 CALL SOUND(-99,111,30,111,30
,F,30,-8,0)
550 NEXT F
560 FOR F=1 TO 30
570 CALL SOUND(-99,111,30,111,30
,4000,30,-8,0)
580 NEXT F
590 CALL CLEAR :: FOR I=1 TO 400
 :: NEXT I
600 DISPLAY AT(12,1):"DO YOU WAN
T INSTRUCTIONS?"
610 CALL KEY(0,K,S):: IF S=0 THE
N 600 :: IF K=89 THEN 640 ELSE 8
90
620 FOR I=1 TO 400 :: NEXT I
630 REM INSTRUCTIONS
640 CALL CLEAR :: DISPLAY AT(12,
1):"YOU HAVE TO TRAVEL AS FAR AS
                              YOU
CAN BEFORE YOU CRASH,"
650 DISPLAY AT(16,1):"AVOIDING O
THER CARS,OIL
                   SLICKS AND BARRIER
S."
660 DISPLAY AT(20,1):"USE THE '<
' AND '>' KEYS TO
                      MOVE."
670 DISPLAY AT(24,1):"PRESS ANY
KEY TO CONTINUE..." :: CALL KEY(
0,K,S):: IF S=0 THEN 670 :: IF K
<>1 THEN 890 ELSE 670
680 REM SKILL LEVEL
690 CALL CLEAR :: FOR I=1 TO 400
 :: NEXT I :: DISPLAY AT(12,5):"
SKILL LEVEL [1 TO 3]"
700 CALL KEY(0,K,S):: IF S=0 THE
N 700
710 IF K<>49 THEN 720 ELSE 740
720 IF K<>50 THEN 730 ELSE 750
730 IF K<>51 THEN 700 ELSE 760
740 SPEED1=5 :: SPEED2=15 :: SPE
ED3=25 :: SPEED4=35 :: SPEED5=20
 :: GOTO 190
750 SPEED1=10 :: SPEED2=20 :: SP
```

```
EED3=30 :: SPEED4=40 :: SPEED5=2
7 :: GOTO 190
760 SPEED1=15 :: SPEED2=25 :: SP
EED3=35 :: SPEED4=45 :: SPEED5=3
5 :: GOTO 190
770 CALL SOUND(1000,-5,0):: FOR
I=1 TO 9 :: CALL MOTION(#I,0,0):
: NEXT I :: CALL PATTERN(#5,124)
:: FOR A=1 TO 500 :: NEXT A
780 CALL CLEAR :: CALL SCREEN(16
):: CALL DELSPRITE(ALL)
790 REM CRASH
800 FOR I=1 TO 400 :: NEXT I ::
DISPLAY AT(12,4):"YOU CRASHED YO
UR CAR"
810 DISPLAY AT(16,5):"YOUR SCORE
 IS:";SCORE
820 DISPLAY AT(20,8):"HIGH SCORE
:";HSCORE
830 DISPLAY AT(24,1):"PRESS SPAC
E BAR TO CONTINUE" :: CALL KEY(0
,K,S):: IF S=0 THEN 830 :: IF K=
32 THEN 690 ELSE 830
840 CALL SOUND(1000,-5,0):: CALL
 CLEAR :: CALL DELSPRITE(ALL)::
CALL SCREEN(16):: FOR I=1 TO 400
 :: NEXT I
850 REM CRASH
860 DISPLAY AT(12,1):"YOU RAN IN
TO THE HEDGES" :: DISPLAY AT(16,
5):"YOUR SCORE IS:";SCORE
870 DISPLAY AT(20,8):"HIGH SCORE
:";HSCORE
880 DISPLAY AT(24,1):"PRESS SPAC
E BAR TO CONTINUE" :: CALL KEY(0
,K,S):: IF S=0 THEN 880 :: IF K=
32 THEN 690 ELSE 880
890 CALL CLEAR :: FOR I=1 TO 400
 :: NEXT I
900 DISPLAY AT(12,1):"THE RACE I
S ABOUT TO START"
910 REM NATIONAL ANTHEM
920 RESTORE 940
930 READ B,A :: IF A=0 THEN 970
:: CALL SOUND(A,B,0):: GOTO 930
940 DATA 392,300,392,300,440,300
,370,450,392,150,440,300
950 DATA 494,300,494,300,523,300
,494,450,440,150,392,300
960 DATA 440,300,392,300,370,300
,392,900,0,0
970 GOTO 690
```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** Review in last weeks HCW.*

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Simply, it is even better than the original arcade game . . . it is an example of state of the arts game.
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Currently my favourite variant of the game.
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PROGRAM CORRECTION

Technical hitch

Due to production problems we were unable to include a complete listing of Colin Stone's program Steer Clear of Creepy Crawlies in HCW 93. This week we are publishing the complete program. We apologise to all frustrated Spectrum owners who tried to run it.

```
1 REM chase
2 REM ************************
3 REM WRITTEN BY C STONE 1984
4 REM ************************
5 REM **man**
6 BORDER 1
7 REM **GRAPHICS**
10 POKE USR "p",BIN 00111100: POKE USR "p"+1,BIN 00111100: POKE USR "p"+2,BIN 00011000: POKE USR "p"+3,BIN 11111111: POKE USR "p"+4,BIN 00011000: POKE USR "p"+5,BIN 00100100: POKE USR "p"+6,BIN 00100100: POKE USR "p"+7,BIN 01100110
15 REM **energy pill**
20 POKE USR "o",BIN 0: POKE USR "o"+1,BIN 00111100: POKE USR "o"+2,BIN 01111110: POKE USR "o"+3,BIN 11111111: POKE USR "o"+4,BIN 11111111: POKE USR "o"+5,BIN 01111110: POKE USR "o"+6,BIN 00111100: POKE USR "o"+7,BIN 0
25 REM **spider**
30 POKE USR "i",BIN 11000011: POKE USR "i"+1,BIN 00100100: POKE USR "i"+2,BIN 00011000: POKE USR "i"+3,BIN 11111111: POKE USR "i"+4,BIN 00011000: POKE USR "i"+5,BIN 01100110: POKE USR "i"+6,BIN 10000001: POKE USR "i"+7,BIN 01000010
35 REM **mushroom**
40 POKE USR "u",BIN 00011000: POKE USR "u"+1,BIN 01111110: POKE USR "u"+2,BIN 11111111: POKE USR "u"+3,BIN 11111111: POKE USR "u"+4,BIN 10011001: POKE USR "u"+5,BIN 00011000: POKE USR "u"+6,BIN 00111100: POKE USR "u"+7,BIN 00011000
50 FOR b=1 TO 9 STEP 2: FOR n=1 TO 31 STEP 2
53 PRINT INK INT (RND*7);AT b,n;"*"
55 NEXT n: NEXT b
57 FOR m=11 TO 21 STEP 2: FOR n=1 TO 31 STEP 2
60 PRINT INK INT (RND*7);AT m,n;"*"
70 NEXT n: NEXT m
80 FOR n=0 TO 9 STEP 2
90 PRINT FLASH 1; INK 4;AT n,10;"INSECT-CHASE"
95 NEXT n
96 FOR n=10 TO 21 STEP 2
97 PRINT INK 0;AT n,2;"WRITTEN BY COLIN STONE 1984."
98 NEXT n
99 FOR n=1 TO 450: NEXT n: CLS

100 PRINT INK 0;AT 0,8;"*●INSECT-CHASE●*"
110 PRINT AT 2,0;"The object of the game is to collect energy pills ● without being caught by the spiders * !!"
115 BEEP .05,10
120 PRINT AT 5,0;"but you * must collect at least the number of pills the computer tells you to collect to be able to travel onto the next sheet in the teleport!!"; FLASH 1; INK 4;AT 21,5;"PRESS ANY KEY TO PLAY!"
121 BEEP .05,15: PRINT FLASH 1; INK 4;AT 15,0;"* start on right side of screen.";AT 16,0;"*.....left.....";AT 17,0;"TELEPORT top right hand corner."
122 BEEP .05,20: LET hi=0: PRINT INK 2;AT 10,0;"BEWARE! spiders eat energy pills as well so don't hang about!!"; FLASH 1; INK 2;AT 18,4;"ALL INFORMATION IS AT THE";AT 19,6;"BOTTOM OF THE SCREEN!!"
123 BEEP .05,25: PRINT FLASH 1; INK 4;AT 14,5;"USE CUSOR KEYS TO MOVE."
124 BEEP .05,30: PRINT INK 1;AT 12,0;"*=YOU *=SPIDER ●=PILL "; FLASH 1;"#"; FLASH 0;"=TELEPORT"
125 BEEP .05,35: PRINT AT 13,0; INK 2;"*●*●*●*●*●*●*●*●*●*●*●*●*●*●*"
130 IF INKEY$="" THEN GO TO 130
131 CLS
132 PRINT AT 10,27;"*=YOU"; FLASH 1;AT 1,23;"#"; FLASH 1;AT 2,23;"#"; FLASH 0;"TELEPORT";AT 10,0;"*=SPIDER";AT 8,13;"●=PILL";AT 13,11;"↑=MUSHROOM"; INK 2; FLASH 1;AT 20,10;"GET READY!!"
133 FOR n=0 TO 400: NEXT n
135 CLS
136 REM **VARIABLES**
138 LET a=0: LET b=0: LET c=0: LET z=3: LET x=3: LET pil=14: LET sc=0: LET liv=3: LET sh=1: LET lim=3
140 LET fl=0: LET ti=0: LET nu=1: LET sp=10: LET der=0: LET spa=1: LET dera=0: LET spb=18: LET derb=0: LET col=0: LET co=0: LET up=10: LET ac=28
150 PRINT INK 2;AT INT (RND*19),INT (RND*31);"●"
151 IF sh>=3 THEN LET nu=nu+1
152 LET nu=nu+1
153 IF sh>=10 THEN LET z=2
154 IF sh>=13 THEN LET x=2
155 IF sh>=2 AND nu=z THEN LET nu=1: PRINT INK 2;AT INT (RND*19),INT (RND*31);"●"
156 IF sh>=3 AND nu=x THEN LET nu=1: PRINT INK 2;AT INT (RND*19),INT (RND*31);"●"
157 BEEP .005,INT (RND*40)
160 PRINT INK 4;AT INT (RND*19),INT (RND*31);"↑"
170 LET co=co+1
180 IF co=pil THEN GO TO 200
190 GO TO 150
200 IF col>=pil/2 THEN LET fl=1
202 IF col<pil/2 THEN LET fl=0
203 PRINT INK 2;AT 19,0;"SHEET:";sh;" *:";liv;" SCORE:";sc;" HI:";hi;AT 20,0;"NUMBER OF PILLS NEEDED:";pil/2;" ";AT 21,0;"NUMBER OF PILLS COLLECTED:"; FLASH fl;col; FLASH 0;" "
205 LET a=1
210 PRINT INK 0;AT up,ac;"*"
215 PRINT INK 3; FLASH 1;AT 1,31;"#";AT 2,31;"#";AT 1,30;"#";AT 2,30;"#": BEEP .003,20
220 PRINT INK 1;AT sp,der;"*"
222 IF b=1 THEN PRINT INK 1;AT spa,dera;"*"
224 IF c=1 THEN PRINT INK 1;AT spb,derb;"*"
230 LET ti=ti+1
240 IF ti=lim THEN LET ti=0: GO TO 250
245 GO TO 370
250 IF a=1 AND sp<up AND ATTR (sp+1,der)<>60 AND ATTR (sp+1,der)<>57 THEN PRINT AT sp,der;" ": LET sp=sp+1: PRINT INK 1;AT sp,der;"*"
251 IF col>=pil/2 AND up=1 AND ac=31 THEN GO TO 450
252 IF col>=pil/2 AND up=1 AND ac=30 THEN GO TO 450
253 IF col>=pil/2 AND up=2 AND ac=30 THEN GO TO 450
254 IF col>=pil/2 AND up=2 AND ac=31 THEN GO TO 450
255 IF a=1 AND sp=up AND der=ac THEN GO TO 500
260 IF a=1 AND sp>up AND ATTR (sp-1,der)<>60 AND ATTR (sp-1,der)<>57 THEN PRINT AT sp,der;" ": LET sp=sp-1: PRINT INK 1;AT sp,der;"*"
265 IF a=1 AND sp=up AND der=ac THEN GO TO 500
270 IF a=1 AND der>ac AND ATTR (sp,der-1)<>60 AND ATTR (sp,der-1)<>57 THEN PRINT AT sp,der;" ": LET der=der-1: PRINT INK 1;AT sp,der;"*"
275 IF a=1 AND sp=up AND der=ac THEN GO TO 500
280 IF a=1 AND der<ac AND ATTR (sp,der+1)<>60 AND ATTR (sp,der+1)<>57 THEN PRINT AT sp,der;" ": LET der=der+1: PRINT INK 1;AT sp,der;"*"
285 IF a=1 AND sp=up AND der=ac THEN GO TO 500
290 IF b=1 AND dera<ac AND ATTR (spa,dera+1)<>60 AND ATTR (spa,dera+1)<>57 THEN PRINT AT spa,dera;" ": LET dera=dera+1: PRINT INK 1;AT spa,dera;"*"
295 IF b=1 AND spa=up AND dera=ac THEN GO TO 500
300 IF b=1 AND dera>ac AND ATTR (spa,dera-1)<>60 AND ATTR (spa,dera-1)<>57 THEN PRINT AT spa,dera;" ": LET dera=dera-1: PRINT INK 1;AT spa,dera;"*"
305 IF b=1 AND spa=up AND dera=ac THEN GO TO 500
310 IF b=1 AND spa>up AND ATTR (spa-1,dera)<>60 AND ATTR (spa-1,dera)<>57 THEN PRINT AT spa,dera;" ": LET spa=spa-1: PRINT INK 1;AT spa,dera;"*"
315 IF b=1 AND spa=up AND dera=ac THEN GO TO 500
320 IF b=1 AND spa<up AND ATTR (spa+1,dera)<>60 AND ATTR (spa+1,dera)<>57 THEN PRINT AT spa,dera;" ": LET spa=spa+1: PRINT INK 1;AT spa,dera;"*"
325 IF b=1 AND spa=up AND dera=ac THEN GO TO 500
330 IF c=1 AND spb<up AND ATTR (spb+1,derb)<>60 AND ATTR (spb+1,derb)<>57 THEN PRINT AT spb,derb;" ": LET spb=spb+1: PRINT INK 1;AT spb,derb;"*"
335 IF c=1 AND spb=up AND derb=ac THEN GO TO 500
340 IF c=1 AND spb>up AND ATTR (spb-1,derb)<>60 AND ATTR (spb-1,derb)<>57 THEN PRINT AT spb,derb;" ": LET spb=spb-1: PRINT INK 1;AT spb,derb;"*"
345 IF c=1 AND spb=up AND derb=ac THEN GO TO 500
350 IF c=1 AND derb<ac AND ATTR (spb,derb+1)<>60 AND ATTR (spb,derb+1)<>57 THEN PRINT AT spb,derb;" ": LET derb=derb+1: PRINT INK 1;AT spb,derb;"*"
355 IF c=1 AND spb=up AND derb=ac THEN GO TO 500
360 IF c=1 AND derb>ac AND ATTR (spb,derb-1)<>60 AND ATTR (spb,derb-1)<>57 THEN PRINT AT spb,derb;" ": LET derb=derb-1: PRINT INK 1;AT spb,derb;"*"
365 IF c=1 AND spb=up AND derb=ac THEN GO TO 500
370 IF INKEY$="5" AND ATTR (up,ac-1)<>60 AND ac>0 AND ATTR (up,ac-1)=58 THEN LET col=col+1: PRINT AT up,ac;" ": LET sc=sc+20: LET ac=ac-1: PRINT INK 0;AT up,ac;"*": GO TO 200
375 IF INKEY$="5" AND ATTR (up,ac-1)<>60 AND ac>0 THEN PRINT AT up,ac;" ": LET ac=ac-1: PRINT INK 0;AT up,ac;"*": GO TO 200
380 IF INKEY$="8" AND ATTR (up,ac+1)<>60 AND ac<31 AND ATTR (up,ac+1)=58 THEN LET col=col+1: PRINT AT up,ac;" ": LET sc=sc+20: LET ac=ac+1: PRINT INK 0;AT up,ac;"*": GO TO 200
385 IF INKEY$="8" AND ATTR (up,ac+1)<>60 AND ac<31 THEN PRINT AT up,ac;" ": LET ac=ac+1: PRINT INK 0;AT up,ac;"*": GO TO 200
390 IF INKEY$="6" AND ATTR (up+1,ac)<>60 AND up<18 AND ATTR (up+1,ac)=58 THEN LET col=col+1: LET sc=sc+20: PRINT AT up,ac;" ": LET up=up+1: PRINT INK 0;AT up,ac;"*": GO TO 200
395 IF INKEY$="6" AND ATTR (up+1,ac)<>60 AND up<18 THEN PRINT AT up,ac;" ": LET up=up+1: BEEP .005,0: PRINT INK 0;AT up,ac;"*": GO TO 200
400 IF INKEY$="7" AND ATTR (up-1,ac)<>60 AND up>0 AND ATTR (up-1,ac)=58 THEN LET col=col+1: LET sc=sc+20: PRINT AT up,ac;" ": LET up=up-1: PRINT INK 0;AT up,ac;"*": GO TO 200
405 IF INKEY$="7" AND ATTR (up-1,ac)<>60 AND up>0 THEN PRINT AT up,ac;" ": LET up=up-1: BEEP .005,0: PRINT INK 0;AT up,ac;"*": GO TO 200
410 IF col>=pil/2 AND up=1 AND ac=31 THEN GO TO 450
411 IF col>=pil/2 AND up=1 AND ac=30 THEN GO TO 450
412 IF col>=pil/2 AND up=2 AND ac=30 THEN GO TO 450
415 IF col>=pil/2 AND up=2 AND ac=31 THEN GO TO 450
420 GO TO 200
450 LET sh=sh+1: LET b=1
451 IF sh>=4 AND sh<7 THEN LET pil=pil+10
452 IF sh>=7 THEN LET pil=pil+10
455 IF sh<=3 THEN LET pil=pil+10
456 LET b=1
457 IF sh=6 THEN LET c=1
458 IF sh=9 THEN LET c=1
460 IF sh=3 THEN LET c=1
475 PRINT AT sp,der;" ";AT spa,dera;" ";AT spb,derb;" "
478 LET t=0
479 FOR n=-40 TO 0: LET t=t+1: BEEP .005,n: NEXT n: FOR n=0 TO 40: BEEP .005,n: NEXT n: PRINT FLASH 1;AT up,ac;"*": FOR n=1 TO 30: NEXT n
480 IF t<2 THEN GO TO 479
481 IF sh=4 THEN LET pil=14
482 IF sh=7 THEN LET pil=14
483 IF sh=10 THEN LET pil=14
485 LET col=0: LET sp=10: LET der=0: LET spa=1: LET dera=0: LET spb=18: LET derb=0: LET up=10: LET ac=31
487 IF sh=7 THEN LET lim=1: LET a=0: LET b=0: LET c=0: CLS : GO TO 137
488 IF sh=4 THEN LET lim=2: LET a=0: LET b=0: LET c=0: CLS : GO TO 137
490 CLS : LET co=0: GO TO 150
500 PRINT FLASH 1; INK 2;AT up,ac;"*"
505 PRINT AT sp,der;" ";AT spa,dera;" ";AT spb,derb;" "
510 BEEP .8,-30: LET liv=liv-1
515 IF liv=0 AND sc>hi THEN LET hi=sc
520 IF liv=0 THEN PRINT FLASH 1; INK 4;AT 8,10;"GAME-OVER"; FLASH 0;AT 10,1;"DO YOU WANT ANOTHER GAME?(Y/N)!": GO TO 540
523 PRINT AT up,ac;" "
525 LET up=10: LET ac=31: LET sp=10: LET der=0: LET spa=1: LET dera=0: LET spb=18: LET derb=0
530 GO TO 200
540 IF INKEY$="y" THEN CLS : FOR n=1 TO 30: GO TO 135
550 IF INKEY$="n" THEN CLS : STOP
560 GO TO 540
```

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Please support us

I am a young TI-99/4A owner and although your computing weekly magazine has in the past catered for the TI, in the last four to five weeks, listings and reviews seem to be drying up.

I have only been using the TI for some eight months, and although programming is now becoming easier, I'm sure other people also depend very much on magazines like yours to learn about all the functions of our micros.

Do please come to our aid.

Andrew Palmer, Bootle

As mentioned before, our reviews reflect the state of the market. We do realise that we have a very loyal TI readership and we try to cater for their needs, but I'm afraid you are still in a minority. We try our best but we can't please everyone all the time!

Praise for Amstrad

First of all, thanks for producing such an excellent magazine. I believe you really do try to cater for everyone. Keep up the good work.

Secondly, I was most interested in Linda Magyar's comments (HCW 84) and I agree with her. In fact, I have an Amstrad — marvellous computing value — which I am now using for word processing among other things. It is proving, with the aid of a Tasword program, to be exactly what I needed. Zapping aliens can be good fun for an hour or two, but computers have so much "brain power" that it is delightful when their full potential can be explored, and games very rarely do that.

S J Simmonds, Immingham

Plea from the heart

First of all I am going to start by saying 'First of all', because nearly everybody else does.

Anyway, I'd like to congratulate you on publishing a great mag, apart from the fact that there is becoming a lack of VIC-20 programs.

I myself own a VIC-20 with a 16K RAM pack and must say that it is a very versatile machine if you can spare the extra cash for a RAM pack.

As you've probably guessed, I didn't write this letter to tell you what I think of my VIC, I've written to ask a little favour.

On receiving HCW 85 I discovered a neat little screen splitting program in it, for the Commodore 64. As the 64 is so similar to the VIC as far as hardware is concerned, I decided to try and convert it. I tried, and tried, and tried and tried with no success to show for it. Could you please print a VIC version in HCW or at least give hints on conversion with the lines to change for the VIC so that I and many other serious VIC owners can use the useful screen splitter and achieve better graphics.

M Howarth, Bolton

We're looking into the matter. We also plan to feature more VIC-20 material whenever possible.

Moans and groans

I am a 48K Sinclair user and up to now I have had no reason to complain about HCW. However issue 84 has changed all that.

For nine months now I have eagerly awaited Tuesday of each week to get my hands on HCW. I race home, sit down at my computer, turn it on, look for the program page for 48K. Caps shift, caps lock my brain, then type away till the program is finished. Then bang (crash) issue 84 had no program for my 48K.

This will not do. The only reason, or should I say the main reason I buy HCW is for the programs. So for me issue 84 has been a flop and a waste of money. So I suggest you print two programs in the next issue and give me and other devotees some assurance that it won't happen again.

Mr R P Potterton, Leeds

Sorry that you were disappointed, but we're not a Spectrum dedicated magazine. However, we do try to feature listings for the Spectrum whenever we can. You can't keep everyone happy all the time though!

Praise for Wilf

I'm writing this short note to tell you about Kokotoni Wilf from Elite. It's good but I don't think it's as good as Jet Set Willy. After only five days we can get 57 of the 62 pieces of the Dragon Amulet.

Yesterday we found out that you can start on level 2 or level 3 by simply pressing 2 or 3. This may be of help for some frustrated players. Also can anyone get onto the final screen of Factory Breakout? I can only get to the platform screen of Zeta level with a score of 36,700 points.

William Duff, Renfrewshire

P.S. It took help from my friends Andrew Carrey and Rick Johnson on Kokotoni Wilf.

Plea for ZX81

Please could you feature more ZX81 ads and reviews as there haven't been many in HCW. I get your magazine every week and always read it thoroughly.

Darren Shea, Middlesbrough

Our reviews reflect the state of the market and if there aren't many reviews then that means not much ZX81 software is available. The same goes for advertising; however, we do try to feature readers' listings whenever we can.

Disgusted

I read with disgust the letter headed I'm all right Jack (HCW 90). I know that everyone is entitled to their own opinion, but to blatently call people stupid just because their choice of micro doesn't agree with his is downright ridiculous!

Just for the information of the author of that letter, I have been a 16K Spectrum owner for 21 months and recently I purchased an Oric Atmos 48K and let me tell you, I'll take an Atmos instead of a Spectrum every time.

I freely admit that the Oric doesn't have nearly as much software but there is a decent selection. I think the main problem is lack of availability in the shops! If a few more dealers would bother to stock more of the available titles then things might brighten up.

As for how much coverage you should give each machine, I reckon you should try to keep things even. After all the Spectrum has several dedicated magazines already, so why should it dominate this mag as well?

S Carlton, Durham

JSW bug

I am writing to complain about a certain Spectrum game. I recently purchased a ZX Spectrum and I bought Jet Set Willy having been told it was very good. I agree with this but there is one fault. Every now and then the monsters in certain rooms disappear. Then when you go into certain other rooms you die continuously. You then have to totally re-load the game. I think this is a bug.

Could you please tell me what is wrong and how to fix it?

Paul Austin, Northampton

Hint for Dragon

One of the most frustrating aspects of the Dragon 32 is the lack of an auto-repeat facility on the keyboard. The following routine simulates an auto-repeat by utilising the keyboard roll-over table held in memory locations 150 to 159 (hex). It can be included in your own programs.

```
10 FOR I = 0 to 9
20 POKE &H150+I,&HFF
30 NEXT : A$ = INKEY$
40 IF A$ = "" THEN 10
50 PRINT A$;
60 GOTO 10
```

S Williams, Porthcawl

Eye-mangling

What a botch-up in a repetitive paragraph (and a half or two) in The principles of block searching (HCW 90). It truly got my eyes in a twist much to the dismay of fellow train passengers who unfortunately were observing me at the wrong moment.

Nice to see such topics in a weekly magazine (can't blame **you** for not going into detail). I would like to hear some replies to letters from miserable TI-99/4A and Atari owners whose machines seem to be neglected.

I had considered these machines before purchasing my Amstrad and must admit their scarce references was what put me off.

P.S. Keep the Amstrad progs going.

P Lee, London

Sorry, Printing problems made a jumble of what was already quite complicated. Hope you managed to sort it out — we'll try not to do it again.

Health hazard?

I am writing in response to a letter in HCW a few weeks ago. I own a 48K Spectrum and I had considered buying Daley Thompson's Decathlon. But I heard rumours that the game can damage the keyboard, due to the continuous hammering at the keys to build up speed and to jump. I also heard the game can damage joysticks.

So I decided to write to Ocean on the matter, enclosing an s.a.e. in October. Two months later I am still waiting for a reply.

Is it that they have something to hide, or is it just a lack of common courtesy to their customers. I would be interested to hear if anyone else has approached Ocean on this matter and what were their findings.

Stephen Wade, Isle of Wight

Send your letters to Letters, Home Computing Weekly, No.1 Golden Square, London W1R 3AB. Don't forget to name your computer — the best letter could win £5-worth of software. Got a problem with your micro? We'll soon be starting a queries page, so send your technical questions to Queries at the above address.

Number Painter

ASK, London House, 68 Upper Richmond Rd, London SW15

Going a long way towards smoothing the awkward relationship between arcade games and educational software, this program aims to improve your speed at mental arithmetic.

With a self test option, the main section consists of a game using a screen covered in ladders and girders, along which painters have to be guided to reach numbers and numeric operators. A target figure is displayed at the top of the screen, along with a continuously updated total.

Your efforts are timed on a clock in the shape of a bucket of paint. This is hauled up the side of the screen on a rope, and spilled all over the display if you run out of time.

Written for children aged from five to 14 years, there are 48 different levels of play available.

Initially choosing Mr Plod, who walks to work, will quickly accustom you to the rules of play. You move on to Mr Speedy as and when the self test results show an improvement in numeracy.

A pleasing screen display makes this a lighthearted way of learning an otherwise notoriously difficult subject. **D.H.**

instructions	100%
playability	90%
graphics	100%
value for money	85%

Bingo CBM 64 £6.95

Tynesoft Computer Software, Addison Ind Est, Blaydon NE21 4ZE

Even after playing this game several times, I find writing a review difficult. I am sure everyone knows the game, but just in case, I'd better explain it. You have a board covered in numbers, which you cross off when they are called. The first person to cover a line in any direction or the four corners of the board wins.

This program allows you to play four boards and gives you the option to use the Currah Speech 64 to call the numbers. You have the further option of up to 99 people playing. However, as you can only see four cards displayed, this exercise seemed pointless.

On screen is a set of numbers. Should your card win and your lucky numbers match, you could go on to win real money. You have to record your entry on the reverse of the cassette and send it off to Tynesoft to be entered in that month's draw.

All things considered, I can't see the point in this program. Anyone wanting to play Bingo can find a live game nearby, with instant prizes. **M.W.**

instructions	80%
ease of use	80%
graphics	75%
value for money	60%

QL-Chess Sinclair QL £19.95

Sinclair Research, Stanhope Rd, Camberley, Surrey

More often than not, the early commercial software for a new computer is attrocious. Psion has changed all that with QL-Chess. There is only one way I can describe it — superb!

It plays a very powerful game of chess; it won the recent World Microcomputer Championship, so it should provide a reasonable challenge for most mortals! There are 28 levels of play, and even at the lowest it's hard to beat! If you find a game difficult, QL-Chess is kind enough to advice you what to do next.

The range of features offered are impressive. It has a vast array of opening moves, or you can set up your own start position, play against the clock, go back through a game to analyse moves, obtain a printout of game analysis, save and load games, etc, etc.

The most impressive feature is surely the 3D chess board. You can almost believe that you're looking at a real board. Moving pieces is simplicity itself, and sprite graphics slide your piece to the required square.

The pack insert claims without modesty 'QL-Chess is an outstanding program in every way.' I can't disagree with that! **D.N.**

instructions	80%
playability	90%
graphics	100%
value for money	90%

Lucky dip

A mixed bag of programs here. Our reviewers give their expert advice

Prediction Birthday File CBM 64 £12.95

Blandford Press, Link Hse, West St, Poole, Dorset

This set comprises a cassette and book. From the prominence of the word 'Prediction' in the title, and the book covered in astrological signs, I thought I was in for an interesting time.

The book is an introduction to astrology and explains how you can set about constructing a birth chart and then interpret it. This is fine, but what it doesn't tell you on the packaging is that you need several other books and special paper before you can start.

The book is well written, but very technical and quite difficult for a beginner. The write-up on the back of the box states that together the book and program provide a complete astrological workshop and I expected to be able to input relevant data, then go back to the book for an interpretation. Instead, all the cassette contained was a very slow loading birthday file, into which you can enter details of friends' birthdays.

The cassette was so slow to load that it would be quicker writing the birthday in a book. Overall, an expensive waste of time. **M.W.**

instructions	60%
ease of use	50%
display	60%
value for money	50%

PCW Games Collection CBM 64 £4.95

Century Communications, Portland Hse, 12-13 Greek St, London W1V 5LE

This is a package of 20 programs, all of which have been published in Personal Computing World and are now presented on this cassette and in a book of the same name.

The games range from innovative, through copies of old favourites, to boring. Side 1, game 1, is a Rubik cube game which I found so difficult that I soon moved on. Also on this side were two word games, one a wordsearch puzzle and the other a solution to wordsearch puzzles. There are also shoot-the-alien games, land the space ship and maze games for you to try. Old favourites include a fairly good version of Monopoly, an Orthello and Gomoku, which is a five-in-a-row noughts and crosses.

Both sides are crammed with games so everyone should be able to find something to their taste; mine were a version of Yahtzee, a dice game, and a new game called Splash. This game involved changing the colours of squares and eventually laying claim to them. **M.W.**

instructions	80%
ease of use	75%
graphics	80%
value for money	95%

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